INCREMENTAL VALUE OF CORONARY CTA IN PATIENTS WITH NEW ONSET DILATED CARDIOMYOPATHY

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Background and aim: Dilated Cardiomyopathy (DCM) is a common disease with high morbidity and mortality. While atherosclerotic coronary artery disease (CAD) is a common cause of a group of DCM; known as ischemic cardiomyopathy (CMP). There is another group of DCM which develops secondary to systemic diseases, drug exposure or even idiopathic; this group is known as non-ischemic CMP. Exclusion of significant atherosclerotic CAD therefore, is an important step in the management of DCM. Computed tomography angiography (CTA) of the coronary arteries has been widely used as a non-invasive diagnostic test to assess the coronary arteries. Our aim is to assess the incremental value of performing coronary CTA in patients with new onset DCM.

Methods: A retrospective review of 754 patients with newly diagnosed DCM from January 2010 to June 2015 was performed. Patients older than 18 years of age with low to intermediate probability of having significant CAD who underwent coronary CTA were included. Patients with known CAD or ischemic cardiomyopathy were excluded. Patients were followed up for a minimum period of 6 months and up to 5 years.

Results: Total number of patients who met the entry criteria was 74 patients; mean age is 47 years and range (22-78) years. There were 54 males and 20 females. Mean ejection fraction was 32% and range (10-40%). 15 patients (20%) were diagnosed to have CAD using coronary CTA. Only 3 patients were diagnosed to have significant CAD on CTA and a final diagnosis of ischemic CMP confirmed by conventional coronary angiogram (CCA), nuclear myocardial perfusion or Cardiac Magnetic Resonance. 3 coronary CTA were limited by arrhythmia and or heavy coronary calcifications. The specificity of coronary CTA in excluding significant CAD was 92%. None of the patients with normal or < 50% narrowing of any coronary arterial territory on coronary CTA was diagnosed to have significant CAD and or ischemic CMP during follow up period.

Conclusion: Coronary CTA can help avoid CCA in a sizable subgroup of DCM patients with low to intermediate probability of having significant CAD.

Background: Incidental intracranial or retinal arterial dilatations have been revealed in patients undergoing cerebral or retinal angiography. Most of these lesions are generally symptomless, however they could lead to life threatening situations. We hypothesized that arterial ectasia or dilating lesions are systemic diseases which share similar pathogenesis. Therefore, we investigated the coexistence of cranial and retinal dilating arterial lesions in patients with diffuse coronary artery ectasia (CEA).

Methods: Forty patients with diffuse CEA (Markis Class 1 and 2) after coronary angiography underwent brain magnetic resonance (MR) angiography and retinal arterial imaging. The patients were compared with age- and sex matched thirty-eight patients without cranial arterial dilatation on brain MR angiography and cardiovascular disease.

Results: A total of 78 (40/38) patients constituted the study population (study/control groups). Of them, 38 (23/15) were men and mean age was 57 ± 13 (59 ± 11 / 54 ± 14) years. In correlation analysis, MMP-8, sICAM-1, IL-6 levels and the diameter of retinal artery branches were significantly correlated with the presence of diffuse CEA. In multivariate regression analysis, sICAM-1 levels (OR: 1.013, p = 0.046) and the diameter of right inferior retinal artery (OR: 1.161, p = 0.008) were found as independent variables, which had statistically significant effects on the presence of diffuse CEA. In ROC curve analysis, sICAM-1 level ≥ 368 ng/mL measured had a 68% sensitivity and 63% specificity (AUC: 0.736; 95% CI 0.622 - 0.851; p = 0.001) and the diameter of right inferior retinal artery ≥ 79.5 mm measured had a 91% sensitivity and 69% specificity (AUC: 0.887; 95% CI 0.804 - 0.970; p < 0.001) in predicting diffuse CEA.

Conclusion: Significant positive correlation between MMP-8, sICAM-1, IL-6 and diffuse CEA supports the idea that vascular inflammation and endotelial damage play a role in the pathogenesis of CEA. The correlation between the diameter of retinal artery branches and diffuse CEA supports our hypothesis that arterial dilatation could be a systemic disease, thereby suggesting us for further cardiovascular evaluation in patients with dilating arterial lesions.

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ADDITIONAL DIAGNOSTIC VALUE FOR CORONARY ARTERY DISEASE AT CORONARY COMPUTED TOMOGRAPHY ANGIOGRAPHY OF INFLAMMATORY MARKERS AND CAROTID ULTRASOUND ASSESSMENT

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Background: The present study investigated the relationship between carotid disease, inflammatory mediators and coronary artery disease (CAD), focusing on the possible incremental value of inflammatory markers in cardiovascular risk stratification of subjects screened by carotid
ultrasound (CUS) and finally assessed by coronary computed tomography angiography (CCTA).

**Methods and materials:** One-hundred-thirty-four consecutive and symptomatic patients (mean age 61±9 years, male 52%) were enrolled in this primary prevention study. Each subject underwent CCTA, CUS and symptomatic patients (mean age 61±9 years, male 52%) were enrolled in this primary prevention study. Each subject underwent CCTA, CUS and systemic inflammatory activity assessment (interleukin [IL]-2r, IL-6, IL-10, high sensitivity-C-reactive protein [hs-CRP]).

**Results:** Subjects with multi-vessel CAD at CT scan were characterized by high errates of presence of carotid disease (83% vs 46%, p<0.01), and higher levels of all considered interleukins (IL-10 0.7±1.9 vs 0.05±0.6 pg/mL, p<0.01; hs-CRP 9±17.4 vs 4.1±4.1±4.7 mg/dl, p<0.05; IL-6 62.6±24.1±1.6 vs 4.5±2.5±3.3 pg/mL, p<0.05; IL-8 21±0.3±2.35 vs 78.4±15.8±4.3 pg/mL, p<0.01; IL-2r 789.0±502.4 vs 607.9±235.1 UI/mL, p<0.05). Increased IL-6 levels were detectable comparing subjects with normal findings at CT coronary scan, coronary stenosis<50% and >50% (p<0.05).

High errates of significant CAD and multivessel CAD at CT scan were observed considering subjects without both carotid plaque and IL levels>cut off value (group -/-), subjects with either carotid plaque or IL levels>cut off value (group +/ -), and those with both carotid plaque and IL levels>cut off value (group +/+). p<0.01. **Conclusion:** The presence of increased IL levels in addition to carotid artery disease predicts higher rates of severe CAD at CT scan.

**EFFECT OF ADIPOSE TISSUE COMPARTMENTS ON THE PRESENCE OF CORONARY ARTERY DISEASE**

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**Background:** Previous studies have shown link between ectopic adipose tissue depots and coronary artery disease (CAD). Our objective was to assess the relationship between epicardial fat volume (EFV), subcutaneous adipose tissue area (SAT), visceral adipose tissue area (VAT) and the presence of CAD as assessed by coronary CTA.

**Methods:** We included subjects from the BUDAPEST (Burdon of Atherosclerotic Plaques Study in Twins) study. Readers assessed every coronary artery segment for the presence of atherosclerotic plaque. We classified the patients into CAD and no CAD groups, and calculated the segment involvement score (SIS: total number of segments with any plaque). In addition we measured the EFV on the coronary CTA dataset and the SAT, VAT on a single CT slice acquired at the L3/L4 level.

**Results:** In total we included 195 asymptomatic subjects with no history of CAD (mean age: 56.1±9.4, female 64.1%), 106 participants had any plaque with a median SIS of 3.0 (IQR: 1.0–5.0). We used robust maximum likelihood estimated clustered standard errors correcting for family clustering. Logistic regression was performed in Mplus 7.31 to assess the independent predictors of the presence of CAD. The EFV (odds ratio [OR]:1.32; p<0.001), age ([OR]:1.1; p<0.001), female (OR):0.1; p=0.000), hypertension ([OR]:3.3; p<0.05) were independent predictors of CAD.

**Conclusion:** Independent of the traditional risk factors EFV is associated with the presence of CAD. This finding supports the hypothesis that EFV is in connection with coronary atherosclerosis development.

**CALCIMAGING AND SELECTIVE CT ANGIOGRAPY IN COMPARISON TO FUNCTIONAL TESTING FOR SUSPECTED CORONARY ARTERY DISEASE: THE MULTICENTRE, RANDOMIZED CRITERI**

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**Aims:** To compare the effectiveness and safety of a cardiac CT algorithm with functional-testing in patients with symptoms suggestive of coronary artery disease (CAD).

**Methods and results:** Between April 2011 and July 2013 350 patients with stable angina, referred to the outpatient clinic of four Dutch hospitals, were prospectively randomized between cardiac CT and functional-testing (2:1 ratio). The tiered cardiac CT protocol included a calcium scan followed by CT angiography if the Agatston calcium score was between 1 and 400. Patients with test specific contra-indications were not excluded from study participation. By one year, fewer patients randomized to cardiac CT reported anginal complaints (p=0.012). The cumulative radiation dose was slightly higher in the CT group (6.6±8.7±4.7 vs 6.1±8.3±3.8, p<0.0001). After 1.2 years, event-free survival was 96.7% for patients randomized to CT and 89.8% for patients randomized to functional-testing (p<0.011). After CT the final diagnosis was established sooner (p<0.0001), and additional downstream testing was required less frequently (25% vs 53%, p<0.0001), resulting in lower cumulative diagnostic costs (€369 versus €440; p<0.0001). **Conclusion:** For patients with suspected stable CAD, a tiered cardiac CT protocol offers an effective and safe alternative to functional-testing. Incorporating the calcium scan into the diagnostic workflow was safe and lowered diagnostic expenses and radiation exposure.

**CORRELATION BETWEEN CORONARY ARTERY CALCIUM SCORE AND NONINVASIVE CORONARY FLOW RESERVE**

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**Background:** Noninvasive quantification of coronary flow reserve (CFR) using cardiac positron emission tomography (PET) adds incremental diagnostic and prognostic information. Likewise, coronary artery calcium scoring (CAC) is an established tool for the evaluation of patients with suspected coronary artery disease (CAD). The aim of this analysis is to determine if an elevated CAC correlates with CFR among patients with suspected CAD.

**Methods:** We included 1759 patients (mean age = 59 ± 11 years, 56% females) without known CAD, who underwent a rubidium-82 PET MPI and CAC in the same setting for clinical indications. All patients had Rest Stress Rubidium Imaging with List Mode Acquisition. Gated, Static and Dynamic data were reconstructed. A CFR more than ≥2.0 was considered normal. Correlation coefficients were calculated between CFR and CAC score.

**Results:** The mean CFR was 1.8±1.2 while 657 patients (37%) had zero CAC. Patients with abnormal CFR were older (61 ± 12vs. 57±10 years, p<0.001) with higher prevalence of diabetes (60% vs. 43%, p<0.0001) and hypertension (84% vs. 70%, p<0.0001). CAC showed significant but weak inverse correlation with CFR (r=−0.09, p<0.0001). Using multivariate logistic regression, CAC was an independent predictor of impaired CFR (odd ratio 1.99, 95% confidence interval 1.47–2.69, p<0.0001).

**Conclusion:** In patients with suspected CAD, there is a statistically significant but weak inverse correlation between CAC content and CFR. This suggests that CAC and CFR provide different yet complimentary information regarding atherosclerosis.
Background: Myocardial perfusion imaging (MPI) is the most commonly used modality in diagnosis of hemodynamically significant coronary artery disease (CAD). However, MPI has limitations in the presence of balanced multivessel disease (MVD) and left main (LM) coronary artery disease, occasionally resulting in false-negative results despite the high cardiovascular risk associated with this condition. The purpose of this study was to assess the incidence of severe coronary artery disease (CAD) in the presence of a very high coronary artery calcium (CAC) score (>1,000) in stable symptomatic patients without known CAD but with normal MPI results.

Methods: A total of 2,659 prospectively acquired consecutive patients were referred for MPI and evaluation of CAC score by CT. Of this patient population, 8% (222/2,659) had ischemia without myocardial infarction (MI) on MPI and 11% (298/2,659) had abnormal MPI (MI and/or ischemia). On presentation 1% of the patients (26/2,659) were symptomatic, had a CAC score >1,000 and normal MPI results. The definition of normal MPI was strict and included a normal hemodynamic response without ischemic ECG changes and normal imaging, particularly absent of transient ischemic dilatation. All of these 26 patients with a CAC score >1,000 and normal MPI findings underwent cardiac catheterization.

Results: Of these 26 patients, 58% (15/26) had severe disease (>70% stenosis) leading to revascularization. Of this group, 47% (7/15) underwent percutaneous intervention, and 53% (8/15) underwent coronary artery bypass grafting. All of these 15 patients had either MVD (14/15) or LM coronary artery disease (1/15), and represented 0.6% (15/2,659) of all referred patients. The majority, 90% (8/9), had severe CAD with typical chest pain.

Conclusion: A very high CAC score (>1,000) with normal MPI in a small subset of symptomatically stable patients was associated with a moderate incidence of severe CAD (95±37 – 77%). LARGER studies and/or a meta-analysis of small studies are needed to more precisely estimate the incidence of CAD in this population. This study also supports the concept that a normal MPI result in patients with severe CAD may be due to balanced MVD.

Automated Quantitative Plaque Analysis for Discrimination of Coronary Chronic Total Occlusion and Subtotal Occlusion in Computed Tomography Angiography

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Background: The noninvasive differentiation between chronic total occlusion (CTO) and subtotal occlusion (SO) is clinically important for planning revascularization strategies and prognosis assessment. We evaluated the utility of automated rapid plaque analysis in differentiating CTO from SO in patients with ambiguous coronary lesions on coronary computed tomography angiography (CTA).

Methods: Sixty-three consecutive patients with 63 ambiguous coronary lesions on CTA without a definite discrimination between CTO and SO, as judged by the visual assessment of an experienced CT reader, were included. The lesion length (LL), diameter stenosis, plaque volume and composition, remodeling index and contrast density difference (CDD) (reflecting intraluminal contrast kinetics over the lesion) were assessed using an automatic software tool (Autoplaq). All patients were followed by invasive coronary angiography.

Results: Mean patient age was 65 ± 9 years with 39 males (62%). Coronary angiography confirmed 28 CTO and 45 SO. Chronic total occlusions showed significantly longer LL (6.4 ± 12.3 vs. 1.0 ± 2.2 mm, p = 0.03) and higher CDD (74 ± 31 vs. 55 ± 32% p = 0.02) compared with SO. The optimal thresholds for prediction of CTO for CDD and LL were ≥43% and >1 mm, respectively (max. sensitivity: 82% for CDD, max. specificity: 77% for LL). The guidewire manipulation time correlated with LL (r = 0.529, p = 0.004) and CDD (r = 0.435, p = 0.021) in lesions attempted by percutaneous coronary intervention.

Conclusion: Automated CTA plaque analysis may be applied as a noninvasive tool to differentiate CTO from SO.

THE ROLE OF COMPUTED TOMPGRAPHIC ANGIOGRAPHY IN PREDICTING LEFT ANTERIOR DESCENDING ARTERY GRAFTABILITY WHEN CATHETER ANGIOGRAPHY IS INCONCLUSIVE

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Background: Graftability of the left anterior descending artery (LAD) has important prognostic value for coronary artery bypass graft (CABG) surgery. However, with a totally occluded LAD, catheter coronary angiography might be insufficient to determine its graftability.

Objectives: We evaluated coronary computed tomographic angiography (CTA) in the assessment of LAD graftability when the distal segment was not well visualized by catheter angiography.

Methods: We enrolled 31 patients with equivocal eligibility for CABG due to total occlusion of the LAD with poor distal flow defined by catheter angiography. Patients with LAD diameters ≥1.5 mm by CTA underwent CABG surgery, and the diameter was reassessed intraoperatively.

Results: The mean age was 54 ± 14; seven patients (23%) had suitable LAD targets on CTA and underwent successful CABG (group A). Another 24 patients (77%) had non-graftable LADs (group B). T-test analysis of group (A) showed no significant difference between mean LAD diameter measured by CTA and during surgery (1.6 ± 0.3 mm vs. 1.5 ± 0.3 mm, P = .21). The preoperative ejection fraction (EF) was not significantly different between groups A and B (35 ± 8% vs. 35 ± 7%. P = .2). After 21 ± 7 months follow-up, EF was significantly higher in group A than in group B (41 ± 5.8% vs. 34 ± 8%. P = .01, respectively). Six patients had patent LAD grafts on CTA follow-up one year after the surgery.

Conclusions: CTA may provide valuable information about LAD size and graftability when catheter angiography is inconclusive.

CORONARY CT ANGIOGRAPHY WITH A STANDARDIZED LOW DOSE PROTOCOL – IMAGE QUALITY AND RADIATION EXPOSURE

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Background: Radiation dose for coronary CT angiography is of concern, and numerous techniques to limit patient exposure have become available. We developed a broadly applicable standard low-dose coronary CT angiography protocol using a third generation dual source CT system and...
evaluated dose and image quality in a series of consecutive “all-comer” patients with suspected CAD. 

Methods: Consecutive patients referred for coronary CT angiography due to suspected coronary artery disease were screened. Exclusion criteria were: heart rate > 65 bpm in spite of pre-treatment with β-blockers, atrial fibrillation, frequent ectopic beats (>5 / minute), total Agatston Score > 1000 and body weight > 120 kg. All acquisitions were performed using a third generation dual source CT system (Somatom Force, 2 x 192 mm, temporal resolution 66 msec) and prospectively ECG-triggered axial acquisition triggered at 70% of the heart cycle, with 90 kV tube voltage and 450 mAs tube current. Data sets were reconstructed using a mixture of filtered backprojection and iterative reconstruction (Admire, level 2) with a slice thickness of 0.5 mm and increment of 0.3 mm. Image quality was assessed on a per-segment level using the 18 segment model proposed by the Society of Cardiovascular CT. A 4-scale visual score was used (1= excellent image quality, 2= minor artifacts, 3= major artifacts, still assessable, 4= non-assessable).

Results: 80 consecutive patients were screened. Out of these, 30 patients were excluded [atrial fibrillation (7), frequent ectopic beats (4), body weight >120 kg (3), heart rate >65 bpm (16)]. Coronary CT angiography was successfully performed according to the study protocol in 50 patients. Mean age was 58±11.6, mean heart rate 59±5 bpm and mean BMI was 25.8±3.3. In 92% of the acquired data sets (46 patients) the entire coronary tree was scored as assessable whereas in 4 patients at least 1 coronary segment was classified as non-assessable. A total of 629 coronary segments were evaluated. The mean image quality score was 1.3±0.3. Only 8 segments (1.3 %) were scored as non-assessable and 16 segments (2.5 %) showed major artifacts, but were still considered evaluable. In 96.2 % of the coronary segments, image quality was either excellent or had minor artifacts. The mean dose length product was 87.7±0.11 mGy·cm which corresponds to an estimated effective radiation dose of 1.2±0.11 mSv.

Conclusion: Using “lenient” exclusion criteria and a strictly standardized low-dose protocol with prospectively triggered axial acquisition, coronary CT angiography can be performed in the majority of patients with high image quality and very low radiation dose.

ULTRA-LOW-DOSE LOW-IODINE CORONARY CT ANGIOGRAPHY PERFORMED WITH STANDARD TEMPORAL RESOLUTION 64-SLICE SCANNER IN LEAN PATIENTS

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Purpose: Although coronary CT angiography (CCTA) is gaining widespread acceptance for non invasive evaluation of coronary arteries, the radiation exposure and the administration of iodinated contrast agents are still reasons for concern. We evaluated the diagnostic accuracy of CCTA performed with standard temporal resolution 64-slice scanner and use of ultra-low concentration contrast medium and 80-kV tube voltage to reduce iodine load and radiation dose.

Methods: 45 patients with BMI ≤25 and indication to a non-emergent low-dose coronary angiography (ICA) we enrolled in the study. CCTA were performed with prospective ECG-triggering, 80 kV and 500 to 550 mA. All patients received an 80-ml bolus of iodixanol-270 at an infusion rate of 5 mL/sec. Image quality score (by 4-point Likert scale), type of artifacts, CCTA evaluability and diagnostic accuracy and radiation exposure were assessed.

Results: The pre-test probability of CAD was low-intermediate (39%). Accordingly, the prevalence of obstructive CAD was 40% (18 out of 45 patients). The majority (93%) of patients were pre-treated with intravenous metoprolol before scanning and a HR suitable for prospective ECG-triggering CCTA was achieved (53±3 bpm). The mean effective dose was 1.1±0.4 mSv. The iodine load was 21.6±44.3 out of 720 coronary segments were classified as excellent image quality. Coronary evaluability (number of coronary segments evaluable/total number of coronary segments), in a segment-based model, was 97% (699/720 segments). In a segment-based analysis, sensitivity, specificity, positive predictive value, negative predictive value and accuracy for >50% coronary stenosis identification vs. ICA were 89%, 99%, 89%, 99% and 99%, respectively. In a patient-based analysis, sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 94%, 89%, 83%, 96% and 91%, respectively.

Conclusions: In lean patients, image quality and diagnostic accuracy of ultra-low-dose low-Iodine CCTA are good and similar with values reported in the literature for standard tube voltage and iodine load protocols.

SUBMILLISIEVERT CT ANGIOGRAPHY FOR CAROTID ARTERIES USING NEW ADAPTIVE STATISTICAL ITERATIVE RECONSTRUCTION- V: PRELIMINARY EXPERIENCE

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Background: To assess evaluability of an ultra low dose CT angiography (CTA) protocol for carotid arteries using new adaptive statistical iterative reconstruction algorithm-V (ASIR-V).

Methods: 65 patients, referred to our hospital for CTA of the carotid arteries due to positive ultrasound examination were enrolled in our study. All the patients underwent CTA with 80 kV, modulation dose mA, ASIR-V and 50 ml of low concentration iso-osmolar (iodixanol 320 mg I/ml) iodinated contrast medium. 128 carotid arteries were analyzed. The image quality of carotid arteries and Willis circle was evaluated with a 4-point Likert-scale. For each exam attenuation, image noise, signal-to-noise ratio (SNR), contrast-to-noise ratio (CNR) at level of common carotid artery (CCA), internal carotid artery (ICA) and at level of Circle of Willis and Effective Dose (ED) were evaluated.

Results: The mean image quality score was 1.24±0.2. Mean attenuation values were 711.8±162.4 and 710.4±159.7, for right and left CCA respectively and 675.3±172.7 and 695.8±180.1, for right and left ICA respectively. Mean SNR and CNR for right and left CCA were 38.6±18.2, 35.5±16.9 and 41.3±17.5, 36.7±16.5 respectively. Mean SNR and CNR for right and left ICA were 27.3±8.0, 24.1±7.5 and 32.5±13.2, 28.7±11.9 respectively. Mean SNR for right and left anterior cerebral arteries were 25.9±8.6 and 23.8±4.2 respectively. The mean value of SNR of the basilar artery was 25.5±9.9. Mean ED was 0.53±0.09 mSv.

Conclusion: CTA for carotid arteries using new adaptive statistical iterative reconstruction - V allows to perform good quality exams with submillisievert radiation exposure.

SUBMILLISIEVERT COMPUTED TOOMOGRAPHY WITH MBIR BEFORE PULMONARY VEINS RADIOFREQUENCY CATHETER ABLATION OF ATRIAL FIBRILLATION: IMPACT ON RADIATION EXPOSURE AND OUTCOME

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Background: The outcome of radiofrequency catheter ablation (RFCA) of atrial fibrillation (AF) has improved thanks to left atrium (LA) anatomy reconstruction by computed tomography with adaptive statistical iterative reconstruction algorithm (CTASIR) before the procedure. CTASIR strategy is associated to an increase of cumulative effective radiation dose (ED). A model based iterative reconstruction algorithm (MBIR, GE Healthcare, Waukesha, Wisconsin) has developed (CTMBIR) for image noise reduction reducing the ED. Aim of this study is comparing the CT and RFCA characteristics, AF recurrence after procedure and radiation exposure between RFCA guided by image integration with CTASIR versus CTMBIR.

Methods and materials: 120 patients were addressed to CTASIR (Group 1:N=60;mean age 60±9.7;10.1y) or CTMBIR (Group 2:N=60;mean age 59.7±11.3 y) for evaluation of LA before RFCA. All patients were subsequently treated by image integration supported RFCA. Image noise, signal
to noise ratio (SNR), contrast to noise ratio (CNR), RFCA procedural characteristics, rate of AF recurrence and CT radiation exposure were measured.

**Results:** Mean followup was similar (578±284 vs. 591±278 days; p=ns). Group 2 showed a higher SNR and CNR of LA as compared to Group 1 (p<0.001). No differences were found in terms of RFCA parameter: procedural duration; fluoroscopy time; pulmonary veins isolated and the rate of AF recurrence between Group 2 vs Group 1. Group 2 showed a 94% reduction of ED as compared to Group 1 (0.4±0.04 mSv vs 6.4±1.8 mSv; p<0.01).

**Conclusion:** CT-MBIR allows accurate reconstruction of LA anatomy in AF patients undergoing to RFCA with a submillivolt effective radiation and comparable success rate of RFCA with CT-ASIR technique.

**INCIDENCE AND PROCEDURAL OUTCOME OF BICUSPID AORTIC VALVE IN 684 PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE IMPLANTATION**

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**Introduction:** Data on transcatheter aortic valve implantation (TAVI) in bicuspid aortic valve (BAV) is rare and inconsistent, particularly concerning prevalence of BAV and procedural outcome. While echocardiography may not permit to reliably detect BAV, Multi-detector row CT (MDCT) has high diagnostic accuracy. Hence, MDCT was used in this retrospective analysis to identify BAV among consecutive patients undergoing TAVI and to analyze the impact of BAV on procedural outcome.

**Methods:** 684 consecutive patients with severe aortic stenosis who underwent TAVI between 2012 and 2014 were included. Pre-procedural MDCT was used to determine leaflet phenotype. Genuine BAV was diagnosed according to Sievers et al. (type 0: purely bileaflet; type 1: trileaflet anlage; 1 raphe; type 2: trileaflet anlage, 2 raphes). Functional BAV was defined as the presence of symmetric tricuspid configuration of all three cusps in diastole, but bicuspid configuration with fusion of two adjacent cusps during systole. Device success according to VARC II criteria was compared between BAV and non-BAV patients.

**Results:** Mean age was 82.2±5.9 years, logistic Euroscore was 24.3±12.2, and 54.2% were female. Echocardiography classified only 15 cases (2.1%) as BAV, while MDCT revealed BAV more frequently (p<0.001). A 29 mm Sapien XT prosthesis would have been implanted in 63%, 45% and 57% of patients for sizing based on Dmean, Darea and Dcirc, respectively. Using area based sizing, Sapien 3 prostheses with diameters of 23, 26 and 29 mm were implanted in 25%, 47%, and 28% of the 167 patients with a mean valve size of 25.9 mm. Recommendations for sizing of a Sapien XT prosthesis would have been larger than for Sapien 3 in 68% of patients based on Dmean, in 35% of patients based on Darea, and in 54% of patients based on Dcirc. Using Dmean, mean recommended valve size for the Sapien XT prosthesis was 26.9 mm (p<0.0001 in comparison to Sapien 3). Using Dcirc, mean recommended valve size for the Sapien XT prosthesis was 26.9 mm (p<0.0001 in comparison to Sapien 3). A 29 mm Sapien XT prosthesis would have been implanted in 63%, 45% and 57% of patients for sizing based on Dmean, Darea and Dcirc, respectively, which is significantly more frequent than for the Sapien 3 valve (p=0.01 for all comparisons).

**Conclusion:** For various sizing regimens, CT based recommendations for the Sapien XT valve yield larger prosthesis sizes than for the newer generation Sapien 3 valve. Since the major advantage of the Sapien 3 valve is a reduced incidence of regurgitation, use of a Sapien XT prosthesis in individuals with a low risk of aortic regurgitation should be considered.

**NON-CARDIOVASCULAR COMPUTED TOMOGRAPHY INCIDENTAL FINDINGS IN PATIENTS WHO UNDERWENT TAVI PROCEDURE**

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**Background and aim:** Trans-catheter aortic valve implantation (TAVI) is a new treatment option for patients with severe aortic stenosis. Pre-TAVI procedure work-up includes computed tomography angiography (CTA) of the heart and aorta from aortic annulus to the iliofemoral arteries. Frequently, there are number of incidental noncardiac findings (INCF) in pre-TAVI CTA. However, the frequency and clinical significance of these INCF unknown. The aim of our study is to investigate the prevalence of INCF and their clinical significant.

**Methods:** A retrospective review of 67 patients underwent dedicated pre-TAVI CTA from 2010 till 2015. Non-cardiovascular INCF were classified according to their clinical significance into 3 categories. The 1st category includes findings that may require urgent treatment. The 2nd category includes findings that need further evaluation or follow up. The 3rd category includes incidental findings that require no further follow or recommendation.
**Results**: Total patients number is 67 patients, mean age is 73±8 years. All patients had INCF and the total number is 248. 69% patients had chest findings, 85% patients had abdominal findings, and 33% patients had musculoskeletal findings. Results based on categorical classification as follows: 9%, 23%, 66% of these 248 findings belong to the 1st category, the 2nd category, and the 3rd category respectively.

**Conclusion**: Non-cardiovascular INCF are common in pre-TAVI CTA presumably due to increased age of such specific population. These findings have variable clinical significance and some of them might require acute treatment or additional evaluation, and should be managed properly taking into consideration patient's life expectancy and comorbidities.

**Table: Distribution of the 2nd category INCFs based on their anatomical regions. The total number of 2nd category INCFs is 62.**

<table>
<thead>
<tr>
<th>Region</th>
<th>2nd Category findings</th>
<th>Frequency</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest</td>
<td>Lung nodules</td>
<td>16% (10)</td>
<td>37% (23)</td>
</tr>
<tr>
<td></td>
<td>Hilar soft tissue with calcification and enactment of the adjacent structures</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thyroid nodules</td>
<td>9.7% (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thyroid enlargement</td>
<td>4.8% (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thyroid calcifications</td>
<td>4.8% (3)</td>
<td></td>
</tr>
<tr>
<td>Abdomen</td>
<td>Prostate enlargement (7 with calcification)</td>
<td>24% (15)</td>
<td>58% (36)</td>
</tr>
<tr>
<td></td>
<td>Adrenal nodule</td>
<td>9.7% (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypodense liver lesion</td>
<td>9.7% (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypervascular liver lesion</td>
<td>4.8% (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liver capsular retraction and hypodensity</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Features of liver cirrhosis</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cystic pancreatic lesion</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Renal cyst with possible internal enhancement</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persplenic partly calcified soft tissue mass</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fluid filled heterogeneous uterus</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Osteopenia with non-aggressive iliac lytic areas</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lumbar vertebrae complete collapse with posterior bulge</td>
<td>1.6% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non aggressive well defined lytic iliac bone lesion with internal calcification</td>
<td>1.6% (1)</td>
<td></td>
</tr>
</tbody>
</table>

**DYNAMICS OF AORTIC ANNULUS MORPHOLOGY ON ECG-GATED CT ANGIOGRAPHY: A COMPREHENSIVE EVALUATION OVER THE ENTIRE CARDIAC CYCLE.**

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**Background**: To assess the dynamics of aortic annulus morphology over the entire cardiac cycle in patients undergoing CT angiography for planning of transcatheter aortic valve implantation (TAVI).

**Methods**: 14 patients (age 76-91, male:female 10:4) with severe aortic valve stenosis candidate to TAVI and 10 patients (age 57-75, male:female 6:4) with suspected CAD underwent a coronary CT angiography examination with retrospective ECG-gating on a high definition 64-row CT scanner (Discovery CT750 HD, GE Healthcare, Milwaukee, WI, USA). Images were reconstructed with a slice thickness of 0.625mm at 10% increments over the entire cardiac cycle (phase 0 to 9 starting from telediastole). The following measurements of annulus were made for each phase: maximum (MxD, mm), minimum (MnD, mm), mean diameter (MD, mm), ellipticity index (EI, defined as MxD/MnD), cross-sectional area (CSA, mm²), and perimeter (Perim, mm).

**Results**: The maximum, minimum, and percentage change of each parameter in the TAVI and in the CAD group were: MxD 27.95±3.2 (phase 0), 25.46±0.1 (phase 2), 15.8% and 1.47±0.2 (phase 6), 25.46±0.1 (phase 2), 18.77±3.6 (phase 6), 403.62±73.3 (phase 2), 15.3%; Perim: 79.81±9.0 (phase 0), 75.86±11.1 (phase 5), 4.9% and 84.52±13.8 (phase 0), 76.82±9.1 (phase 7), 9.1%. Differences between the two groups were not statistically significant for each parameter.

**Conclusion**: The morphology of aortic annulus varies throughout the cardiac cycle, with the annulus bigger in telediastole and smaller in systole and protodiastole. The annulus was more elliptic in diastole than in systole. Perim showed the lowest percentage variation over the cardiac cycle in TAVI patients.

**PREDICTION OF FLUOROSCOPIC ANGULATION FOR TRANSCATHERET AORTIC VALVE IMPLANTATION BY CT ANGIOGRAPHY: INFLUENCE ON PROCEDURAL PARAMETERS.**

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**Background**: Complications related to intravascular contrast agent application in transcatheter aortic valve implantation (TAVI) are associated with an increased mortality. Repeated aortograms to achieve an exactly orthogonal visualization of the aortic valve plane increase the amount of required contrast agent during the procedure. This study assessed whether pre-procedural identification of a fluoroscopic projection for an exactly orthogonal visualization of the valve plane by cardiac computed tomography (CT) influences the amount of contrast agent needed intra-procedurally compared to a standard approach based on serial aortic angiograms.

**Methods**: Prospective randomized study of 80 consecutive patients (mean age 81±5 years, male 55%) with symptomatic severe aortic valve stenosis and normal renal function who underwent TAVI. Cardiac CT was performed in all patients for determination of aortic annulus dimensions using a dual source CT system. In 40 patients, the fluoroscopic projection angle was determined from the CT data set and used for the first aortogram. In the other 40 patients, a standard angulation (left-anterior oblique 10°/cranial 10°) was used for the first aortogram. In both groups, if no suitable projection was obtained, the fluoroscopic projection was systematically altered in 10° increments or decrements until a satisfactory view was achieved. Primary endpoint was the amount of contrast agent used intra-procedurally. Additionally, the incidence of acute kidney injury (AKI, according to RIFLE criteria), number of aortograms, procedure duration, post-procedural aortic regurgitation and mortality were analyzed.

**Results**: The number of aortograms (1.2±0.6 vs. 3.2±1.7; p<0.001) needed to achieve a satisfactory fluoroscopic position and the amount of contrast...
EVALUATION OF CORONARY PLAQUE CHARACTERISTICS WITH CORONARY COMPUTED TOMOGRAPHY ANGIOGRAPHY IN PATIENTS WITH NON-OBSTRUCTIVE CORONARY ARTERY DISEASE: A LONG-TERM FOLLOW-UP STUDY

Daniele Andreini, Gianluca Pontone, Saima Mushtaq, Marco Guglielmo, Edoardo Conte, Chiara Segurini, Andrea Baggiano, Andrea Annoni, Alberto Formenti, Virginia Beltrama. Centro Cardiologico Monzino, IRCCS the Department of Cardiovascular Sciences, University of Milan, Milan, Italy

Background: Obstructive coronary artery disease (CAD) is associated with major cardiovascular events (MACE). Recent studies suggested that even non-obstructive CAD increases MACE rate. However, how to discriminate patients at higher risk among those with non-obstructive CAD is still unclear.

Objectives: Aim of this study was to evaluate whether coronary computed tomography angiography (CCTA) may detect specific plaque characteristics that may affect prognosis in patients with non-obstructive CAD.

Methods: From a registry of consecutive patients who underwent CCTA between April 2005 and December 2007 for suspected CAD, we enrolled 196 patient who were found to have non-obstructive CAD. We evaluated coronary positive remodeling index (PRI), plaque attenuation value (HU), stenosis severity and plaque burden (PB) for each coronary plaque detected. Acute coronary syndrome and cardiac death occurrence were endpoints of the study.

Results: A total of 9 hard events were recorded (2 ST-elevation myocardial infarction, 2 Non-ST-elevation myocardial infarction and 5 unstable angina) in 9 different patients at long-term follow-up (mean 95 ±17 months). Patients with hard events had higher degree of lumen stenosis (mean: 38.5% vs. 31.9%; p < 0.0025), higher PB (median 0.52 vs. 0.43; p = 0.0120), higher PRI (mean 1.58 vs. 1.28; p = 0.0006), and lower HU (median 163 vs. 501 p = 0.0368). At multivariate analysis, only low attenuation plaques (HU < 30) (HR 16.79 CI 4.18-67.15; p < 0.0001) and PRI > 1.5 (HR 7.78 CI 1.89-31.95; p = 0.0024) were significantly associated with hard events. Cumulative hard event-free survival was 96% for patient without high risk plaque and 50% for those with plaque presenting both low HU and PRI > 1.5 (log-rank p = 0.0001).

Conclusions: Low attenuation plaque (<30 HU) and PRI > 1.5 at CCTA seem to be promising.

DYNAMIC FIRST PASS CT PERFUSION IMAGING OF THE MYOCARDIUM VS. INTRACORONARY TRANSLUMINAL ATTENUATION GRADIENT IN CORONARY CT ANGIOGRAPHY FOR THE ASSESSMENT OF CORONARY ARTERY STENOSIS

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Purpose: To compare the diagnostic accuracy of dynamic first pass CT perfusion (CTP) imaging and the transluminal attenuation gradient derived from coronary CT angiography in the assessment of coronary artery stenosis.

Material and methods: 34 patients with suspicion of coronary artery disease, who underwent invasive coronary angiography (CA) and assessment of intermediate coronary artery lesions (50-75% diameter reduction) by an invasive pressure wire examination (FFR) were included. All patients underwent a coronary CTA and a dynamic CTP examination under adenosine stress at a 256 slice CT scanner with an 8 second per rotation period of at least 4 years and the influence of social and lifestyle factors such as relationship status, pet ownership and physical activity.

Methods: 3496 patients in whom coronary CT angiography (CTA) was performed because of suspected coronary artery disease between 2004 and 2009 underwent systematic follow-up by structured telephone interview. CT data were analyzed for obstructive (>50% diameter stenosis) and non-obstructive coronary artery disease. For analysis, patients were divided into patients with and without major adverse cardiovascular events (MACE). MACE was defined as cardiac death, resuscitated cardiac arrest, myocardial infarction and stroke. Physical activity was defined as at least one training unit per week.

Results: Follow-up information was obtained in 1916 of 3496 patients (54.8%). The median follow-up period was 75 months (range 51 – 116 months). MACE occurred in 106 (5.5%) patients. At the time of coronary CTA, 246 patients were singles, 1541 were in a relationship (129 patients unknown). 9/106 patients with MACE were single and 85/106 patients with MACE were in a relationship, whereas 237/1810 patients without MACE were single and 1456/1810 patients without MACE were in a relationship (p = 0.23 and p = 0.90). 1283 patients had no pet, 500 had a pet (133 patients unknown). 70/106 patients with MACE had no pet and 23/106 patients with MACE had a pet, whereas 1213/1810 patients without MACE had no pet and 477/1810 patients without MACE had a pet (p = 0.83 and p = 0.31). 605 patients were not physically active and 1162 patients performed sport at least once per week (149 patients unknown). 54/106 patients with MACE were physically active and 1108/1810 patients without MACE were physically active (p = 0.04). 36/106 patients with MACE were not physically active and 569/1810 patients without MACE were not physically active (p = 0.59). 38/106 (35%) patients with MACE had an obstructive coronary artery disease, whereas 337/1810 (18.6%) patients without MACE had an obstructive coronary artery disease (p < 0.0001). In multivariate analysis, the detection of obstructive coronary artery disease by CTA was the only independent predictor for MACE.

Conclusion: In the longterm follow-up of patients undergoing coronary CTA because of suspected coronary artery disease, lifestyle factors such as relationship status, pet ownership or physical activity do not show any difference for MACE. The only independent predictor for future MACE was the detection of obstructive coronary artery disease.
were 71.4 (41.9–91.4) and 73.2 (57.1–85.8) for TAG. Sensitivity and specificity were 90.9 (58.7–98.5) and 84.6 (65.1–95.5) for MBF.

Conclusion: MBF derived from dynamic CTP imaging of the myocardium is superior compared to the TAG derived from coronary CTA for the assessment of coronary artery stenosis.

**COMPUTED TOMOGRAPHY CORONARY ANGIOGRAPHY (CTCA) AS AN IDEAL TOOL FOR NON-INVASIVE DIAGNOSIS OF MYOCARDIAL BRIDGING**

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**Background:** Myocardial bridges (MB) are considered an anatomic variant course of the main epicardial coronary arteries. MB occurrence is largely underestimated by invasive coronary angiography and diagnosis is traditionally made at necropsy or surgery. The prevalence and morphology of MB are not widely investigated in live population, though they can be responsible for anginal pain, major cardiac events and sudden death. CT coronary angiography (CTCA) is ideal for non-invasive detection of MBs, allowing simultaneous visualization of coronary arteries, myocardium and epicardial fat.

**Methods:** We retrospectively evaluated the occurrence, site and morphology of MBs in 1316 patients who underwent CTCA at our Institution from 2010 to 2013 to rule out coronary artery disease. CTCA studies were performed on two 64-row CT scanners (Lightspeed VCT and Discovery CT750 HD, respectively).

**Results:** 80/1316 patients (6%) had MB, and out of them 29 (36.2%) had anginal symptoms and 34 (42.5%) discordant stress test findings. Patients with MB were significantly younger than those without (60.1±12.6 vs 63.5±11.8 years; p=0.01) and showed a trend towards a lower incidence of significant coronary artery stenosis >50% (25.6% vs 36.1%; p=NS). MBs were more frequent on the left anterior descending coronary artery (80%), followed by the circumflex artery (12.5%), intermediate ramus (7.5%) and right coronary artery (0%), and were totally tunnelled in the myocardium in 64/80 patients (80%). Moreover, patients with MB showed a trend towards a greater percentage of absence of atherosclerotic plaques (42.3% vs 34.9%; p=NS). The coronary segments involved in the MB were normal in 1237/1316 patients (94%), and of patients with coronary atherosclerosis (6%), only 13 (1%) had a stenosis >50%.

**Conclusion:** CTCA is the pivotal technique for non-invasive diagnosis of MB and differential diagnosis against microvascular angina. Our findings are in line with literature data derived from necropsy reports.

**RATIONALE AND DESIGN OF THE PERFECTION (COMPARISON BETWEEN STRESS CARDIAC COMPUTED TOMOGRAPHY PERFUSION (CTP) VERSUS FRACTIONAL FLOW RESERVE CT DERIVED (FFRCT) IN THE EVALUATION OF SUSPECTED CORONARY ARTERY DISEASE) PROSPECTIVE STUDY**

Gianluca Pontone 1, Daniele Andreini 1, Antonio Bartorelli 1, Marco Guglielmo 1, Saima Mushtaq 1, Andrea Baggiano 1, Chiara Segurini 1, Edoardo Conte 1, Virginia Beltrama 1, Andrea Daniele Annoni 1, Alberto Formenti 1, Andrea Iorgen Guaricci 2, Mauro Pepi 1, 1 Centro Cardiologico Monzino IRCCS Milan, Italy; 2 University of Foggia Foggia, Italy

**Background:** Despite several non-invasive stress tests are commonly used as gatekeeper to invasive coronary angiography (ICA), the diagnostic yield of invasive procedure remains still low. New techniques such as fractional flow reserve computed tomography derived (FFRCT) and stress computed tomography perfusion (stress-CTP) have emerged as potential strategies to combine anatomical and functional evaluation in one shot-scan. The aim of this study is to compare the feasibility and diagnostic accuracy of FFRCT versus stress-CTP for the detection of functionally significant CAD, using invasive FFR as the reference standard.

**Methods and materials:** The PERFECTION Study is a longitudinal, prospective and consecutive cohort study to compare the feasibility and accuracy of FFRCT versus stress-CTP for the detection of functionally significant CAD. The target populations are symptomatic subjects suspected for CAD and no contraindications for FFRCT and stress CTP who are referred for non-emergent, clinically indicate ICA plus invasive FFR. A total sample size of 200 subjects will be enrolled in 18 months.

**Results:** The primary null hypotheses is that stress CTP is superior as compared to FFRCT for detection of functionally significant CAD in a vessel-based analyses defined by ICA as coronary artery stenosis >50% with invasive FFR ≤0.80 or coronary artery stenosis ≥80% or totally occluded vessels. The primary endpoint is that the null hypotheses is rejected.

**Conclusion:** The PERFECTION Study will provide information about which technologies between FFRCT and stress CTP will be more effective in the diagnosis of functionally significant CAD.

**DIAGNOSTIC ACCURACY OF CORONARY CT ANGIOGRAPHY PERFORMED BY THE NOVEL WHOLE ORGAN VOLUMETRIC HIGH DEFINITION CT SCANNER IN 83 CONSECUTIVE PATIENTS PATIENTS WITH CORONARY STENTS**

Daniele Andreini, Gianluca Pontone, Saima Mushtaq, Marco Guglielmo, Edoardo Conte, Chiara Segurini, Andrea Baggiano, Andrea Annoni, Alberto Formenti, Virginia Beltrama, Mauro Pepi. Centro Cardiologico Monzino IRCCS the Department of Cardiovascular Sciences, University of Milan, Milan, Italy

**Objectives:** To evaluate the image quality, interpretability, radiation exposure and diagnostic accuracy of coronary CT angiography (CTCA) performed with a newest generation of cardiac-CT scanner in a group of consecutive patients, including cases with high heart rate (HR) and atrial fibrillation, with coronary stents.

**Background:** Despite the improvement of the latest scanner generation in terms of temporal and spatial resolution, the CTCA evaluation of coronary stents remains one challenging application of cardiac-CT because of the beam-hardening artifacts due to stent strut. Moreover, the most of the literature showed good CTA stent interpretability and diagnostic accuracy in the subset of patients with low (<65 bpm) and stable HR.

**Materials and methods:** 83 consecutive patients (70 males, mean age 64±10 years old) with previous coronary stent implantation who were scheduled for clinically indicated non-emergent invasive coronary angiography (ICA) were enrolled in the study. CTCA was performed by using a novel whole organ volumetric high definition CT scanner (16cm z-axis coverage with 256 detector rows and 512 slices, gantry rotation time 0.28 sec, spatial resolution 0.23 mm). Prospective ECG-triggering was used. Image quality score (by a 4-point Likert scale on a per-stent level), coronary interpretability and diagnostic accuracy vs. ICA were evaluated and the effective dose (ED) was recorded.

**Results:** The mean HR during the scan was 67±12 bpm. Twenty-seven patients had HR during scanning >65 bpm and other 8 patients were in atrial fibrillation. The overall image quality was high (Likert=3±0.8). The stent interpretability was 97% (147/152 stents). Among the 152 stent segments evaluated, CTCA was able to correctly identify the twenty-five >50% in-stent restenosis detected by ICA (sensitivity 100%); specificity, positive and negative predictive values and diagnostic accuracy for ISR identification in the stented-based analysis was 98%, 89%, 100% and 98%, respectively. The overall mean ED was 2.4±1.2 mSv, with a mean of 3.3±1.3 mSv in high HR or atrial fibrillation and 1.6±1.4 mSv in <65 bpm patients.

**Conclusions:** The novel whole organ high definition CT scanner allows to evaluate coronary stents with high image quality, excellent interpretability and diagnostic accuracy and low radiation exposure, also in the presence of unfavorable HR and heart rhythm.

**IMPLEMENTATION AND EXPERIENCES WITH A STRUCTURED REPORTING SOFTWARE FOR CORONARY CT ANGIOGRAPHY**

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Background: Clinical research and routine clinical work in parallel requires double data entry, therefore increases the workload of clinicians. This is time consuming and increases probability of mistakes, and sometimes the source documents does not contain the required information.

Methods: We implemented an in-house developed coronary CT structured reporting tool with the use of an innovative data capture system. Our reporting template is based on the recommendations of international radiology and cardiology societies. The information is stored mostly in single and multiple choice questions and numeric input fields. Text reports for clinical routine are generated automatically from the scientific database.

Results: The structured reporting tool implemented by our research group guides the physician through the image analysis and generates a radiological report. With intelligent form of visualization and pre-populated default answers only the relevant questions are visible. With this approach we were able to minimize the number of questions and maximize the simplicity of the reporting form. Besides the standardized clinical report, the system generates a scientific database without double data input. The database can be searched and exported for further statistical processing. Since 2014, more than 5000 cardiac CT scans were evaluated with our system. With our standardized platform the overall reporting time is reduced and the quality of the data content is improved and unified.

Conclusions: We implemented an online structured reporting tool for coronary CT angiography. Parallel data acquisition for research and clinical routine can be avoided with our tool while the overall quality of reports improved.

COMPARISON OF IMAGE QUALITY OF ATRIAL FIBRILLATION AND NORMAL SINUS RHYTHM PATIENTS ON SINGLE BEAT VOLUMETRIC CT SCANNER, INITIAL EXPERIENCE WITH A NEW CT SCANNER

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Background: Images of patients with arrhythmias, particularly atrial fibrillation (AF), are often difficult to acquire with coronary CTA due to challenges in image acquisition and temporal resolution. We propose to evaluate image quality (IQ) expressed as Likert scale, signal to noise ratio (SNR), and contrast to noise ratio (CNR) from coronary CTA images acquired with a volumetric single beat CT scanner. Our hypothesis was that there is no significant difference in IQ between patients with and without AF.

Methods: We retrospectively analyzed data of 86 patients (43 AF and 43 sinus rhythm), mean age 54.93 ± 11.6, 46% male, who underwent clinically directed cardiac CT exam because of chest pain at West Kendall Baptist Hospital. Based on patient BMI (mean 29.59 ± 5.48), the kV value and tube current were adjusted within a range of 80–140kV and 122–740mA, respectively. Each scan was done within one cardiac cycle. Motion correction (Snapshot Freeze) was used for motion correction in higher heart rates. Autogating was used to automatically acquire systolic and diastolic (with ECG mA modulation) phases for higher heart rates. IQ was assessed qualitatively (Likert Scale) and quantitatively (SNR and CNR) by experienced reader for 4 vessels: RCA, LM, LAD and LCX on axial and multiplanar reformatted images. Likert scale was used as five point score; 1:Non-diagnostic, 2-Poor, 3-Good, 4-Very Good, and 5-Excellent. SNR and CNR were calculated from the average two CT attenuation value within ROIs placed in the proximal LM and proximal RCA. For contrast comparison, an ROI was selected from the left ventricular wall at mid cavity level.

Results: Images for both groups were of diagnostic image quality and were not statistically significant (p=0.9719) between the groups. Mean Likert Score was 4.2±0.88 (n=43) for AF group and 4.29±0.61 (n=43) for sinus rhythm group. SNR was 8.67±3.28 (n=43) for AF group and 9.36±3.07 (n=43) for sinus rhythm group (p=0.2234). CNR was 6.76±2.7 (n=43) for AF group and 7.50±2.2(n=43) for sinus rhythm group. (p=0.1814); 98.7% (626/636) of coronary segments were available for assessment in AF compared to 99.5% (635/638) in sinus rhythm patients.

Conclusion: Volumetric single beat Coronary CT Angiography is not only feasible, but also provides diagnostic image quality and good diagnostic accuracy for detection of coronary stenosis regardless of heart rhythm abnormality.

VARIABILITY OF INTERPRETATIONS OF CORONARY CT IN THE ED: A SINGLE CENTER EXPERIENCE WITH 5 READERS AND 1572 PATIENTS

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Background: Coronary computed tomography (CCTA) is commonly used to exclude obstructive coronary artery disease (CAD) in low-intermediate CAD-risk patients presenting to the emergency department (ED) with chest pain. ED CCTA program challenges include assuring a homogenous interpretation of CCTA and consistent recommendations among readers.

Methods: We retrospectively evaluated N=1572 consecutive CCTA reports from all 5 of our interpreting physicians (from both cardiology and radiology). The population included patients who presented to the ED with chest pain, low-intermediate pretest CAD probability, an EKG negative for STEMI and negative initial serum cardiac biomarkers. Data collected included: age, gender, coronary artery calcium score (CACS) and the...
readers’ interpretation/recommendation on the CCTA. All patients in our ED receive a CACS before CCTA. Patient age, gender and CACS were used to prove each reader interpreted studies from patients at equal pretest (pre-CTA) probability for CAD. “No CAD” was defined as the absence of corona artery plaque. “Nonobstructive CAD” was defined as plaque with less than 50% diameter stenosis. Patients with no or non-obstructive CAD were discharged directly from the ED. Non-diagnostic studies and patient’s with 50% or greater diameter stenosis were admitted/observed with additional testing as recommended.

Results: A summary of patient, age, gender and CACS is demonstrated in Table 1. Chi squared analysis between an individual reader and pooled data testing as recommended. Reader interpretations are summarized in Table 2. Chi squared analysis demonstrated no statistically significant differences. Reader interpretations are summarized in Table 2. Chi squared analysis demonstrated no statistically significant differences between Readers 1–4 with regards to the probability of any given recommendation. Reader 5 demonstrated a statistically significant difference between the pooled data of the other 4 readers as follows: higher Reader 5 non-diagnostic study rate (13% vs 2.5%, p < .001), lower Reader 5 non-obstructive CAD rate (23% vs 36%, p < .001), higher Reader 5 “cath only” recommendation (10% vs 5.2%, p < .013) and lower discharge from ED rate (67% vs 83%, p < .001). The findings suggest that Reader 5 has a lower threshold than other readers for interpreting a study as “non-diagnostic”, which results in more patients being admitted/observed. There was no statistically significant difference between cardiologist/radiologist readers. Reader specific outcomes will be analyzed separately.

Conclusion: Despite similar CAD-risk patient populations’ variation between CCTA reader recommendations may occur. Further work is needed to determine the effect, if any, on outcomes.

Table 1
Factors Effecting Patient Pretest-Probability of CAD by Reader

<table>
<thead>
<tr>
<th>Reader 1</th>
<th>Reader 2</th>
<th>Reader 3</th>
<th>Reader 4</th>
<th>Reader 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies</td>
<td>168 (11)</td>
<td>271 (17)</td>
<td>683 (44)</td>
<td>270 (17)</td>
</tr>
<tr>
<td>Mean age in years</td>
<td>53</td>
<td>55</td>
<td>53</td>
<td>54</td>
</tr>
<tr>
<td>% Female</td>
<td>52</td>
<td>59</td>
<td>52</td>
<td>58</td>
</tr>
<tr>
<td>% Zero CACS</td>
<td>61</td>
<td>52</td>
<td>50</td>
<td>49</td>
</tr>
<tr>
<td>% 1–100 CACS</td>
<td>20</td>
<td>26</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>% 101–400 CACS</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>% 401 and above</td>
<td>11</td>
<td>11</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 2
CCTA Interpretations and Recommendation by Reader

<table>
<thead>
<tr>
<th>Reader</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of studies interpreted (% total)</td>
<td>168 (11)</td>
</tr>
<tr>
<td>No CAD (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Non-obstructive CAD (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Discharge from ED (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Admit/Observe from non-diagnostic study (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Admit with “stress only” (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Admit with “stress or cath” (%)</td>
<td>166 (11)</td>
</tr>
<tr>
<td>Admit and/or observe total (%)</td>
<td>166 (11)</td>
</tr>
</tbody>
</table>

ONE-YEAR EXPERIENCE OF STRUCTURED DATA COLLECTION AND REPORT GENERATING: SEMMELWEIS CARDIAC CT REGISTRY

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Background: Routine clinical cardiac CT reporting and research data collection both require detailed data acquisition and robust data management. We sought to test the feasibility of automated registry generation regarding the indications, image acquisition parameters and clinical findings of cardiac CT in a single center.

Methods: The Semmelweis Cardiac CT Registry (SCCTR) is a database generated by an in-house developed structured reporting tool that automatically stores all relevant data points, such as anamnestic data, indications, premedication, CT acquisition parameters, segment based coronary evaluation and clinical recommendation.

Results: In total 2866 consecutive patients (age 59.5 ± 11.9 years, 41.3% males) were included in the SCCTR between August 2014 and September 2015. All examinations were performed with a 256-slice CT. Suspected coronary artery disease (CAD) was the main indication (60.1%) followed by left atrial angioiography (20.3%). During the scan 90.6% of the patients had sinus rhythm (heart rate: 61.6 ± 12.6 bpm) and 8.3% had atrial fibrillation. We used prospective ECG triggering in 98.5% of the cases. The average effective radiation dose of the coronary CTA was 4.0 ± 1.4 mSv and 0.5 ± 0.2 mSv for Ca-score scans (conversion factor 0.014). For premedication, 68.3% of the patients received metoprolol, 4.1% ivabradin and 98.5% nitroglycerin. Invasive coronary angiography was recommended in 14.3% and secondary prevention (statin therapy) in 47% of the cases.

Conclusion: Automatic collection of descriptive data is feasible using a structured reporting-registry tool. The main indication for cardiac CTA was to rule out obstructive CAD. Invasive coronary angiography could be avoided in the majority of patients.

CORONARY ATHEROSCLEROSIS FEATURES FOR THE PREDICTION OF ISCHEMIC EVENTS (CAFE-PiE STUDY): A CT-SCAN INTEGRATED SCORE FROM A BI-CENTER REGISTRY

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Background: To date it is unclear how to implement the information on coronary artery disease (CAD) features as evaluated by coronary computed tomography angiography (CCTA) in order to better predict the occurrence of major adverse cardiac events (MACE). The aim of this study is to validate the prognostic role of a comprehensive CCTA-derived score in consecutive symptomatic patients evaluated for suspected CAD.

Methods and materials: Bi-centre prospective registry including 477 consecutive symptomatic intermediate-risk patients without history of known CAD undergoing CCTA for clinical indications. For each patient we evaluated in primary prevention a score based on CCTA findings (plaque remodeling and plaque type) correlated with outcomes. All patients were followed-up for 49 ± 15 months. The endpoint was the occurrence of MACE defined as the composite endpoint including non-fatal myocardial infarction and cardiac death.

Results: The mean CT score was 10.5 ± 10.8 and the prevalence of MACE was 11.3% in overall population. CT score was significantly related to the
incidence of MACE at univariate and multivariate analysis (HR: 2.90; CI 95%: 2.19-3.85). At ROC curve analysis, CT-score was the best predictor of incidence of MACE (AUC: 0.81, CI 95%: 0.78-0.84) as compared to Diamond and Forrester score (p<0.001), segment stenosis score (p<0.05) or segment involved score (p<0.01).

**Conclusion:** The use of an integrated score considering coronary plaque characterization at CCTA may improve the prediction of MACE in symptomatic intermediate-risk patients beyond the standard clinical and CCTA scores.

CORONARY CT ANGIOGRAPHY FOR SUSPECTED ACUTE CORONARY SYNDROME IN THE ERA OF HIGH-SENSITIVITY TROPNINS – MEN VERSUS WOMEN

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**Background:** Early coronary CT angiography (CCTA) in the diagnostic work-up of patients suspected of an acute coronary syndrome (ACS) averts outpatient testing and decreases medical expenditure compared to standard optimal care (SOC) incorporating high-sensitivity troponins (hs-troponins). In this pre-specified analysis, we evaluate differences in outcomes between men and women.

**Methods:** In the BEACON trial, 500 patients suspected of an ACS were randomized to a diagnostic strategy supplemented by early CCTA or SOC incorporating hs-troponins. In this pre-specified analysis, we evaluate differences in outcomes between men and women.

**Results:** The study population consisted of 236 (47%) women and 264 (53%) men (mean age 56±10 versus 53±10 years, p=ns). Women had less obstructive CAD (>50% luminal narrowing) on CCTA and were less diagnosed with ACS.

**Conclusion:** Women have a lower prevalence of CAD and early CCTA might prove more effective for the diagnostic work-up of women suspected of ACS.

TRIPLE RULE OUT VERSUS STANDARD CORONARY COMPUTED TOMOGRAPHY ANGIOGRAPHY IN EVALUATION OF ACUTE CHEST PAIN SYNDROME. A SINGLE CENTER STUDY FROM PRINCE SULTAN CARDIAC CENTRE, QASSIM

Osama Smettee 1, Rami Abazid 1, Heba Saad 2, Sawsan Sayed 1, Abdullah Al Habeeb 2, Fahad Al Harby 2, 1 Noninvasive Imaging Department of Noninvasive Cardiology, Prince Sultan Cardiac Centre (PSCCC), Saudi Arabia; 2 King Fahad Specialist Hospital (KFSH), Qassim, Saudi Arabia

**Background:** Acute chest pain (ACP) in emergency department represents a health care challenge. Triple-rule-out (TRO) Computed Tomography Angiography (CTA) can provide an evaluation of the coronary arteries, aorta, pulmonary arteries, and chest structures in one scan. The aim of our work was to evaluate the diagnostic yield of TRO versus cardiac CTA in patients with ACP. In addition to compare the image quality, contrast material and radiation doses of TRO with standard CTA.

**Methods:** Prospective analysis of 134 TRO CTA data, to assess the presence of coronary artery disease (CAD), aortic dissection, pulmonary embolism and other chest pathology. Then retrospectively to compare the image quality and radiation exposure in TRO CTA with the results from 132 standard CTA scans.

**The results:** Normal coronaries or non-significant CAD was seen in 97 (72.9%) patients, 19 (14.2%) had moderate or significant CAD, two (1.5%) had aortic dissection, three (2.2%) had a pulmonary embolism, 61% had other findings. The image quality score and noise were comparable between the standard and TRO CTA (2.8±0.6 Vs. 2.96±0.6, P=0.28) and (30.5±10.6 Vs. 28.4±1.1, P=0.1) Respectively. The effective radiation dose was significantly lower in the standard compared to the TRO CTA using prospective (4.4±1.7 Vs. 5.1±0.5 mSv=0.008) and (11.9 Vs. 18.3±5 msv, P=0.001) for retrospective gating protocols. The contrast dose was lower with standard protocol compared with TRO CTA (83±5 Vs. 102±9ml, p=0.001).

**Conclusions:** TRO CTA is a valid tool for diagnosis of CAD and provides an accurate detection of non-coronary pathology, but it was associated with higher radiation and contrast doses compared to the standard CTA.

ROLE OF MSCT IN LEFT MAIN INTERVENTION

Tarik Nabil. Egyptian Heart Institute, Cairo, Egypt

**Case report**

**Background:** Through this case we will discuss how MSCT coronary angiography can help in management of patients with LM lesions.

**Methods:** A female patient, 51 y old with multiple risk factors for CAD, atypical symptoms, mild ECG changes, Normal Echo, and history of previous normal coronary angiography except for slow flow 1 year ago, she is unable to exercise and she was arranged for MSCT coronary angiography according to appropriate use criteria.

Contrast enhanced Helical 128-slices MSCT coronary angiography was done followed by multiple reconstructions to assess all coronary segments and cardiac function and revealed a moderate mixed LM lesion and a short LM for which diagnostic coronary angiography was done confirming the diagnosis followed by PCI and stenting of LM-LAD with good results.

**Discussion:** In this case, MSCT provided highly important informations about the presence and severity of LM lesion, site of lesion, calcium content, LM length and caliber, cardiac function assessment and situation of other coronaries, all of these were very helpful and of great importance for both:

1. Decision making for management whether to go for CABG or PCI depending on anatomical features revealed from MSCT.
2. Preparation of equipments and decision making during intervention as special stent size and type and special catheters and their manipulation.

**Conclusion:** MSCT coronary angiography can help before and during management of LM lesion, through determination of type of management whether PCI or CABG and being ready with equipments needed for PCI.

More studies are needed to clarify benefits of MSCT in high risk interventions and even to relate and integrate findings of MSCT with informations needed in intervention scores that determine the way of management such as Syntax score.

FAMILIAL HYPERCHOLESTEROLEMIA PRESENTED WITH SEVERE OBSTRUCTION OF THE LEFT MAIN AND OSTIAL RIGHT CORONARY ARTERY COEXISTING WITH SUPRA AORTIC VALVE ATHEROSCLEROTIC STENOSIS IN A 16 YEARS OLD PATIENT

Osama Smettee 1, Rami Abazid 1, Mohamad Dageistani 2, Sawsan Sayed 1, 1 Noninvasive Imaging Department of Noninvasive Cardiology, Prince Sultan Cardiac Centre (PSCCC), Saudi Arabia; 2 Department of Cardiac Surgery, PSCCC, Qassim, Saudi Arabia
**Introduction:** Familial hypercholesterolemia (FH) is an autosomal dominant disorder that causes severe elevations in total cholesterol and low-density lipoprotein cholesterol (LDLc). FH is associated with a high risk for premature coronary artery disease (CAD), peripheral vascular disease, cerebrovascular disease, or aortic stenosis.

**Case report:** A 16 years old male patient came to our clinic with a history of chest pain and dyspnea on moderate exertion for a period of four months, he has a history of hypercholesterolemia on treatment and a family history of premature CAD and hypercholesterolemia. Physical examination revealed Xanthomas on the extensor surfaces of elbows and knees, serum cholesterol was more than 500 mg per dl. Echocardiography showed normal left ventricular function, mild narrowing of the aortic root above the aortic valve (AV) and a mean gradient of 19 mm Hg across the AV. So we did a Cardiac computed tomography angiography (CTA) study to evaluate the coronary arteries and the aortic root which confirmed the diagnosis of atherosclerotic supra AV stenosis, in addition to severe Left Main and Ostial right coronary artery stenosis, which was confirmed by invasive coronary angiography. The patient condition was discussed with the cardiac surgery team and accepted for coronary artery bypass graft surgery.

**Discussion:** FH is associated with a high risk for premature CAD. Early detection of these complications can improve the prognosis. Cardiac CTA is a valuable tool for screening and diagnosis of such patients.

### SUCCESSFUL REPAIR OF AORTIC COARCTATION WITH A PATENT DUCTUS ARTERIOSUS VIA RETROPERITONEAL APPROACH

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**Background:** Endovascular stenting is a commonly preferred intervention for the thoracic aorta disease, such as coarctation, aneurysm, and dissection (4) A case of AoC associated with patent ductus arteriosus, was successfully closed endovascular stent-graft via retroperitoneal approach on a single angiographic catheterization.

**Methods:** An 18-year-old woman was admitted to our hospital with breathlessness and hypertension. Her medical history included arterial hypertension for one year with no history of traumatic injury or Takayasu’s arteritis. Standard and Doppler echocardiographic findings were normal function of bicuspid aortic valve, coarctation of descending aorta with a measured velocity 3.3m/sn. Computed tomography (CT) angiogram was performed and the aortic diameter was found to be 20 mm at the level of the left subclavian artery and 23 mm at the post clustal descending aorta. The diameter of the coarctation segment was measured as 11 mm, and patent ductus arteriosus was established (Figure 1). Aortic CT angiography was performed via right radial artery. Percutaneous treatment of the aortic coarctation and patent ductus arteriosus with a graft stent were decided. According to the CT findings, diameter of both common femoral arteries and internal iliac arteries was less than 5 mm. Both femoral and iliac artery diameters were not wide enough for insert to catheterisation. We decided to use retroperitoneal approach to common iliac artery for insertion of the stent graft. The graft stent was passed through the sheather, after checking the correct positioning in which was including the orifice of the left subclavian artery. The balloon catheter was inserted through the stent-graft and the balloon was inflated fully.

**Result:** The procedure was completed successfully. According to the control angiography, there was no endovascular leak. Before discharge CT angiography (Figure 2) was performed and discharged two days after procedure.

**Conclusion:** The retroperitoneal approach is a usefull alternative, when the surgical team does not find suitable way for inserting device. We believe that this method could potentially be widely preferred technique in the future for correction of such anomalies.

**Fig. 1:** 3D CT angiography study. Both quartation segment of aorta an patent ductus arteriosus were shown clearly.

**Fig. 2:** Postoperative 3D CT angiography study.

### ANOMALOUS ORIGIN OF THE RIGHT CORONARY ARTERY WITH MALIGNANT COURSE: AN INCIDENTAL MDCT FINDING IN TWO MIDDLE-AGED AND ELDERLY MALE PATIENTS

Maria Mylona, Maria Karmesini, Katerina Oikonomi, Andreas Karatzas, Maria Papavasilopoulou, Andreas Samothrakitis. Department of Radiology, Olympion General Clinic, Patras, Greece

**Background:** Anomalous right coronary artery (RCA) originating from the left sinus is an infrequent coronary anomaly, which has received much attention due its association with angina, myocardial infarction or sudden death. However, it can be asymptomatic and discovered incidentally, even in middle-aged and elderly patients who have never experienced angina.

**Methods:** A 56 year old asymptomatic male, being an amateur football player in his youth, with positive family history of coronary artery disease and a history of hypertension and hyperlipidemia and a 66 year old male with a history of arrhythmias, hypertension and hyperlipidemia underwent screening MDCT coronary angiography, to rule out coronary artery disease. Siemens Definition Dual Source CT scanner was used.

**Results:** Screening MDCT coronary angiography revealed an anomalous origin of RCA from the left sinus of Valsalva with a high (above the
pulmonary valve) interarterial course between the aorta and pulmonary artery and an intramural part of the proximal RCA. The 56 year old patient presented with a slit-like ostium of the anomalous RCA, with close proximity to the ostium of the left main artery. The proximal part of RCA coursed intramurally in the aortic wall for a length of 7mm, before running between the aorta and pulmonary artery. No significant atherosclerotic plaques were seen even though the calcium score was very high (>400). The 66 year old patient presented with an anomalous RCA ostium from the left sinus. The artery turned rightwards in an angle of 80 degrees and traversed in between pulmonary trunk and aorta for a length of 2cm. The intramural part seemed to have a length of 14mm. No significant atherosclerotic plaques were seen and the calcium score was very low (18.2).

In both patients conventional coronary angiography was performed. No significant stenoses were seen and conservative treatment was advised.

Conclusion: The anomalous origin and malignant course of RCA, with high interarterial course and intramural part, can be clinically silent and never produce angina symptoms, even in middle-aged and elderly patients, with a history of sport activities, positive family history and other risk factors for coronary artery disease.

TREATMENT OF VALVE THROMBOSIS FOLLOWING TRANSCATHETER AORTIC VALVE IMPLANTATION WITH VITAMIN-K-ANTAGONIST: A CASE REPORT

Zeynep Bal, Stephan Achenbach, Mohamed Marwan. Department of Cardiology, University of Erlangen, Germany

Introduction: Transcatheter aortic valve implantation (TAVI) is an established treatment for symptomatic aortic stenosis among elderly patients whose surgical complication risk seems to be high. Till now about 150,000 or more TAVI procedures have been performed worldwide but little is known of the occurrence of valve thrombosis following TAVI and its therapy.

Case presentation: A 80-year-old-male patient with transcatheter aortic valve implantation (Edwards Sapien XT 29 mm) 2 years previously reported new onset chest pain and shortness of breath. Immediately following implantation, the patient had been symptom free, with a transvalvular gradient of 15/10 mmHg, and had been treated with a combination of ASS and clopidogrel for 6 months. At presentation, transthoracic and transesophageal echocardiography showed a systolic gradient of 105/67mmHg was noted together with suspected leaflet thickening, while leaflet motion was preserved. Cardiac CT was performed for suspected valve thrombosis and confirmed the presence of thrombotic material within the non-coronary and right coronary cusp of the prosthesis (see figure). The patient received treatment with a vitamin K antagonist, which effectively restored the transvalvular gradient to baseline within 2 months.

Discussion: The current antithrombotic treatment following TAVI is aspirin plus clopidogrel for three to six months, but this regimen is not evidence-based. We report the case of late aortic valve thrombosis after TAVI which could be treated through implementation of an anticoagulant (VKA) therapy. The optimal antithrombotic strategy after TAVI is still under investigation and requires validation.

EXERTIONAL ANGINA DUE TO AN UNUSUAL CORONARY ANOMALY

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Case report
A 46-years-old female patient presented to our outpatient clinic with exertional chest pain. Physical examination was unremarkable. The electrocardiogram showed T wave inversion in the anterior leads. Echocardiography showed hypokinetic anteroseptal wall and left ventricular ejection fraction 45%. Invasive coronary angiography showed a superdominant right coronary artery (RCA) that gives a long posterior descending artery (PDA) and a large posterolateral (PL) branch. The left system failed to be cannulated. Dual-source CT coronary angiography (Somatom Definition; Siemens, Germany) was performed. It confirmed the presence of a single superdominant RCA and the absence of left main trunk (LMT). The proximal RCA gave a small left anterior descending artery (LAD). The LAD passed anteriorly, through the infundibular septum and caudal to the pulmonary valve to end at the mid anterior interventricular groove. The PDA wrapped around the apex to end at the mid segment of the anterior interventricular groove. The PDA wrapped around the apex to end at the mid segment of the anterior interventricular groove as a second LAD. The PL branch continues as LCX to the mid left atrioventricular groove, ending at the left lateral border of the LV as an obtuse marginal (OM) branch. In the literature, we found no reports of a single superdominant RCA and septal course of the LAD. She had a calcium score of 0, but mild atherosclerotic changes were noted. Even though this anomaly may possibly be malignant, it was not amenable to surgery due to the small size and short course of the LAD. Medical treatment was maximized.