optimal cut-off values. The first group was defined as having baseline CACS's under 44 AU and annual percent progressions of CACS under 9%/year. The second group was classified as those who had either more than 44 AU baseline CACS's plus a less than 9%/year annual percent progression or those had a less than 44 AU baseline CACS's with a more than 9%/year annual percent progression. The third group consisted of patients with a greater than 44 AU baseline CACS as well as a greater than 9%/year annual percent progression. In the multivariate analysis, the third group showed a 16 fold higher likelihood of having MACE than reference group 1 [Hazard ratio (HR) 15.57, 95% CI 1.72–141.44, p=0.02].
Conclusions: The baseline CACS combined with an annual percent progression of CACS can effectively predict future MACE. The suggested optimal cut-off value of baseline CACS is 44 AU with an annual percent progression of 9%/year.

P2396 | BEDSIDE
Stress computed tomographic perfusion improve diagnostic accuracy of coronary computed tomographic angiography in intermediate to high risk patients for coronary artery disease

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Background: Coronary computed tomographic angiography (CCTA) was approved as alternative to functional strategy in patients with suspected coronary artery disease (CAD) and low to intermediate risk (prevalence of CAD<50%) thanks to its excellent negative predictive value. Unfortunately, in the intermediate to high risk population (prevalence of CAD≥50%), the presence of multiple lesions and coronary artery calcium could limit the diagnostic accuracy of CCTA regarding the assessment of flow limiting obstructive CAD. Static stress computed tomographic perfusion (CTP) may represent an opportunity to overcome this limitation.
Purpose: The aim of this study is to evaluate the incremental diagnostic value of CTP over CCTA in intermediate to high risk patients scheduled for invasive coronary angiography (ICA) plus clinically indicated invasive fractional flow reserve (FFR) for suspected CAD.
Methods: Consecutive symptomatic patients with intermediate to high pre-test probability of CAD and scheduled for clinically indicated ICA+FFR, were prospectively enrolled. All patients underwent rest-CCA followed by stress-CTP protocol with adenosine with injection of 70 ml of Iodixanol 320 as additional test. CCTA and CTP were defined positive for the presence of 50% stenosis and for the presence of subendocardial hypoenhancement encompassing ≥25% of transmural myocardial thickness within a specific coronary territory, respectively. At ICA, obstructive CAD was defined by the presence of ≥50% stenosis and hemodynamically significant CAD was defined by the presence of >50% stenosis on left main coronary artery, severe (>80%) or occlusive stenosis or FFR<0.80. The additive value of CTP versus CCTA to rule out the presence of hemodynamically relevant stenosis were performed on a per-vessel basis.
Results: Seventy-six patients [mean age: 65±9 years, male: 49 (64%)] were included in our study. Obstructive CAD was found in 32% (74/228) of vessels and in 61% (46/76) of patients. Hemodynamically significant CAD was present in 23% (52/228) of vessel and in 42% (32/76) of patients. In a vessel-based model, CCTA alone and CTP showed a sensitivity and specificity of 96% [CI95%:91–100)], 72% [CI95%:65–79)] and 85% [CI95%:75–85)], 86% [CI95%:81–91)], respectively. CTP showed a higher area under the curve (AUC) as compared to CCTA alone to rule out hemodinamically significant CAD (0.86 vs. 0.78, p:0.02).
Conclusions: In patients with intermediate to high pre-test likelihood of CAD, CTP had incremental value over CCTA alone, to diagnose the presence of hemodynamically significant CAD.

P2397 | BEDSIDE
Quantitative versus qualitative evaluation of static stress computed tomographic perfusion to detect hemodinamically significant coronary artery disease in intermediate to high risk patients

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Background: Static stress computed tomographic perfusion (CTP) is a useful tool to improve the detection of hemodinamically significant coronary artery disease (CAD) of coronary computed tomographic angiography (CCTA) in the subset of patients with intermediate to high risk for CAD. Qualitative and quantitative methods were proposed to evaluate a static stress CTP. However, a few data are available regarding to the comparison of diagnostic performance of these two approaches.
Purpose: The aim of this study is to perform a head to head intra-patient comparison of qualitative evaluation versus quantitative evaluation of static stress CTP to detect hemodinamically significant CAD in intermediate to high risk patients scheduled for invasive coronary angiography (ICA) plus clinically indicated invasive fractional flow reserve (FFR).
Methods: Seventy-six patients [mean age: 65±9 years, male: 49 (64%)] scheduled for clinically indicated ICA+FFR, were prospectively enrolled. All patients underwent rest-CCA followed by stress-CTP protocol with adenosine with injection of 70 ml of Iodixanol 320. In each patient, a qualitative evaluation with visual approach (CTP was defined positive for the presence of subendocardial hypoenhancement encompassing ≥25% of transmural myocardial thickness within a specific coronary territory) and a quantitative evaluation with transmural perfusion ratio (TPR) (sub-endocardium mean density/sub-epicardium mean density <0.9) were measured. At ICA, hemodynamically significant CAD was defined by the presence of >50% stenosis on left main coronary artery, severe (>80%) or occlusive stenosis or FFR<0.80. The diagnostic accuracy of qualitative and quantitative stress CTP versus ICA+FFR were compared on a per-vessel basis.
Results: Obstructive CAD was found in 32% (74/228) of vessels and in 61% (46/76) of patients at ICA. Hemodynamically significant CAD was present in 23% (52/228) of vessel and in 42% (32/76) of patients. The mean time for quantitative analysis was significantly higher as compared to qualitative analysis (35±6 min vs. 5±2 min, p<0.01). In a vessel-based model, CTP with qualitative evaluation showed a higher specificity (86% [CI95%:81–91)] vs. 77% [CI95%:71–83)], p<0.05) and similar sensitivity (85% [CI95%:75–85)] vs. 88% [CI95%:80–97)], p:0.56) as compared to quantitative CTP. Similarly, the area under the curve (AUC) of qualitative versus quantitative static CTP was significantly higher (0.81 vs. 0.74, p<0.01).
Conclusions: In static stress CTP, the qualitative evaluation of perfusion defect is associated with a less time consuming and higher specificity and diagnostic accuracy to detect functionally significant CAD as compared to quantitative stress CTP. Several reasons such as imaging artifacts due to motion, beam hardening, reconstruction artifacts, and global transmural ischemia may explain these findings.

P2398 | BENCH
Coronary calcification as a mechanism of plaque media shrinkage a multimodality intracoronary imaging study

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Aims Whether coronary calcification process is correlated with plaque/media shrinkage (PS) remains unclear. The purpose of this study is to assess the relationship between calcification process and PS combining intravascular ultrasound (IVUS) and optical coherence tomography (OCT) from post-procedure to 5-year follow-up in patients treated with Bioresorbable Vascular Scaffolds (BVS).
Methods and results: In 15 patients, anatomic landmarks and radiopaque markers of BVS were used to match OCT and IVUS images for serial analysis. Plaque/media shrinkage (PS) was defined as relative decrease in plaque/media area>5%. The correlation between calcification process and PS was investigated. Seventy-two grayscale-IVUS, echogenicity-IVUS and OCT pair-matched cross sections in- and out-scaffold segments were matched at baseline and follow-up (in total 432 images). In total, 35 out of the 72 cross sections showed PS, and 37 cross sections showed no PS (non-PS) at 5-year follow-up. PS showed inverse correlation with Δ calcium area on OCT (r=-0.65, p<0.001), Δ calcium arc (r=-0.63, p<0.001), Δ calcium length on OCT (r=-0.67, p<0.001), and Δ calcium arc on IVUS (r=-0.57, p<0.001) respectively. On echogenicity analysis, PS was associated with a decrease in hypoechogenicity (r=0.47, p<0.001). An increase in calcium area was inversely correlated to a decrease in hypoechogenicity (r=-0.40, p<0.001). Interestingly, the increase in calcium area was correlated to an increase in lumen area (r=0.37, p=0.002).
Conclusion: Calcification process is correlated counterintuitively with plaque/media shrinkage, hypoechogenic tissue decrease and lumen enlargement. Combining IVUS and OCT provides a unique method to assess the correlation between calcification process and plaque/media shrinkage.

ECHOCARDIOGRAPHY FOR VALVULAR HEART DISEASE

P2399 | BEDSIDE
Applying 3D echocardiography derived stroke volume for quantification of aortic valve area in low-flow aortic stenosis: The superiority of a hybrid approach

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Background: It is well acknowledged that evaluation of aortic stenosis (AS) severity should incorporate transvalvular flow by stroke volume index (SVi), mean pressure gradient (MPG) and calculation of aortic valve area index (AVAi). The current guidelines suggest calculating SVi by echocardiography based on the left ventricular outflow tract diameter and Doppler velocity time integral (SVi2D) which encompasses many pitfalls and limitations. We intended to compare three-dimensional echocardiographic derived SVi (SVi3D) to SVi2D, among the patients