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Improved Computed tomography angiography accuracy through optimal patient selection and analysis technique

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Backround: Computed coronary tomography angiography (CCTA) suffers from reduced accuracy especially in high risk patients. Artifact due to motion or blooming by calcium are the main responsible for this reduced specificity.
Objective: To improve specificity by selection of low-intermediate risk patients with a low atherosclerotic burden, by optimilizing heart rate control and by combining independent coronary analysis by two complementary techniques.
Methods: 155 consecutive patients hospitalized for chest pain underwent CCTA . Coronary anatomy was consensually assessed by a radiologist using curved maximal projection rendering (MPR) and a cardiologist using axial data, double oblique as well as MPR.
Results: 85% of the patients were at low to intermediate risk and only 15% were at high risk for obstructive coronary disease according to Duke criteria. 88 (58%) were males, aged 52 + 11 years. The median coronary calcium score was 1 AU (0.0 to 5.3). Mean heart rate was 60$^{9}_{-7}$ bpm. Normal coronaries (by CCTA) was found in 72 patients (46.5%) , < 50% stenosis (non significant) in 48 (31.0%), 10 patients(6.5%) had 50-70% stenosis whereas 17 (11.0%) had a significant coronary disease (>1 vessel with(>70 %)). Eight patients (5.2%) had 1 at least one non diagnostic segment. 28 (18%) patients were sent to invasive angiography after CCTA . On a patient basis, including patients catheterized because of a non diagnostic test (considered positives), the sensitivity was 94.7%, the specificity 71.2% the positive predictive value of 87.4% and a negative predictive value of 86.3%. Of note, 13/17 patients (76%) sent to invasive angiography for>50% stenosis by CCTA and 10/11 (91%) of patients with a >70% stenosis underwent PCI .
Conclusion: These initial results suggest that by selecting mainly low to intermediate risk patients, less than 20% will need invasive angiography and more than 75% of patients with >50% stenosis will undergo coronary revascularization.