Abstract: P1803

Patients safety as a priority of ultra low contrast and low radiation dose coronary computed tomography angiography one-beat acquisition

Authors:
I Timofeeva1, JL Sablayrolles1, L Macron1, J Feignoux1, 1Centre cardiologique du Nord, radiology - Saint-Denis - France,

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Background: Coronary computed tomography angiography (CCTA) allows to accurately and precisely evaluate coronary arteries in patients with suspected coronary artery disease. Nevertheless, the main clinical concerns are radiation exposure and contrast media (CM) dose. Dose and contrast reduction is an essential factor for providing a cardiac CT for extended patient population.

Purpose: To minimize CM and radiation dose by optimizing injection protocols with maintaining the high image quality.

Methods: We prospectively included 204 consecutive patients. CCTA was performed on a 256-slices CT one-beat acquisition with standard tube voltage 120kV. Patients were divided into two groups according to the injection protocols. Group A was scanned by using a standard three-phase injection protocol by using smart shot dual injector. Patients of group B underwent a new three-phase injection protocol with 63% CM dose reduction. Radiation dose, attenuation, image noise, signal-to-noise ratio (SNR) as well as contrast-to-noise ratio (CNR) were calculated. Image quality was evaluated using 4-point Likert scale.

Results: The mean age was 61,5±12,2, and 50,5% were males. The body mass index (BMI) was significantly lower in group B (28,1±5,3 kg/m2 vs 24,4±2,9 kg/m2 respectively, p<0,003).

Effective radiation dose of axial scanning was significantly higher on 43% in group A (231,5±110,9 mGy*cm and 160,7±58,7mGy*cm respectively, p<0,007).

Mean amount of CM of group B was lowered by 63,1% on average when compared to group A (75,5±4,7ml in group A and 27,8±5,6 ml in group B, p<0,0001).

There were no significant differences in SNR (15,7±3,4 vs 14,9±6,4, p=0,704), in CNR (24,1±6,6 vs 17,9±8,9, p=0,06) as well as in image quality between groups (3,8±0,4 vs 3,8±0,37, p=0,85).

Conclusion:
New injection protocol of CCTA one-beat acquisition allows to significantly reduce the CM dose on 2,7 times and the radiation exposure on 43% with maintaining the high image quality. Thus, ultra low contrast and low radiation dose cardiac CT leads to patients safety and will increase accessibility for a broad category of patients.