Essential CT for the Nuclear Cardiologist: How to do Calcium Scoring and CT Angiography

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Coronary calcium screening is typically been applied to asymptomatic persons with cardiovascular risk factors. Three mm contiguous slices are performed with low radiation. The amount of coronary calcium can be quantitatively assessed in different ways.

Coronary CT angiography is usually been applied to patients with low to intermediate likelihood of coronary artery disease. For scanning the coronary arteries with contrast media dedicated contrast and scan protocols are required. The protocol needs to ensure high enhancement and minimal motion artifacts. Data acquisition may be performed either with retrospective ECG gating or prospective ECG triggering. The scan and contrast protocol depends on the clinical question and CT scanner used. Prospective ECG triggering is preferred in patients with low heart rate and requires only minimal radiation. In contrast to that retrospective ECG gating is the preferred method in patients with arrhythmia. This acquisition method also allows for assessment of cardiac function. However, it goes along with far higher amount of radiation as compared to prospective triggering.

For post-processing dedicated workstations are available. However, it should be considered that exact grading of coronary artery stenoses is limited due to spatial resolution. Determination of hemodynamic relevance of coronary artery stenosis as detected by CT frequently requires further work up by exercise tests.