

Electron-beam computed tomography (CT) has been used for coronary artery evaluation (calcium scoring) for more than a decade<sup>1</sup>. Cardiac imaging was facilitated by a temporal resolution of 100 msec, achieved by avoiding mechanically rotating x-ray tubes<sup>2</sup>.

The newest generation of 16 and 64 slice CT scanners allow spatial resolution of 0.4 mm with gantry rotation of 400 msec or less. With these scanners, scan length and the required breath-hold is 6-12 seconds<sup>3</sup>. Software innovations, such as prospective and retrospective electrocardiographic gating, allow coronary artery assessment with multi-detector row spiral CT. The combination of good temporal resolution (165-188 msec) and spatial resolution of 0.4 mm offers smaller voxel size coronary imaging and reduced partial volume averaging.<sup>4-7</sup> Radiation doses reported with 16-MDCT coronary CT can reach 13 mSv<sup>5-7</sup>. The recent introduction of 64-MDCT machines may be associated with an even higher radiation exposure due to the use of thinner collimation and higher tube power. ECG pulsing (decreasing the tube current during the systolic phase of ECG) has been proposed by manufacturers for substantial reduction of radiation dose. ECG pulsing, has been reported to reduce the mean dose by up to 50% depending on the patient's heart rate<sup>8,9</sup>. ECG-pulsed tube current modulation is a significant improvement minimizing coronary CT angiography (CCTA) related radiation. It is currently the only dedicated application for dose reduction in CCTA. It is performed in real time during cardiac CT scans, allowing a decrease in radiation exposure of 30 - 50%. The full tube current output is applied only during the relevant phases of the cardiac cycle<sup>10</sup>. The estimated radiation exposure using ECG pulsing is similar to or less than that of a conventional coronary angiography examination<sup>10</sup>.

The quality of these ECG pulsed studies is comparable to non-pulsed studies assuring no compromise in diagnostic ability.

CCTA appears to be an alternative, non invasive diagnostic modality allowing quick and effective coronary evaluation with a high negative predictive value<sup>4,6,7</sup>.

ECG pulsed studies offer significant reduction in radiation exposure retaining effectiveness, as described.

## References:

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