

# Coronary Angiography with Low-Dose Computed Tomography at 1.4 mSv

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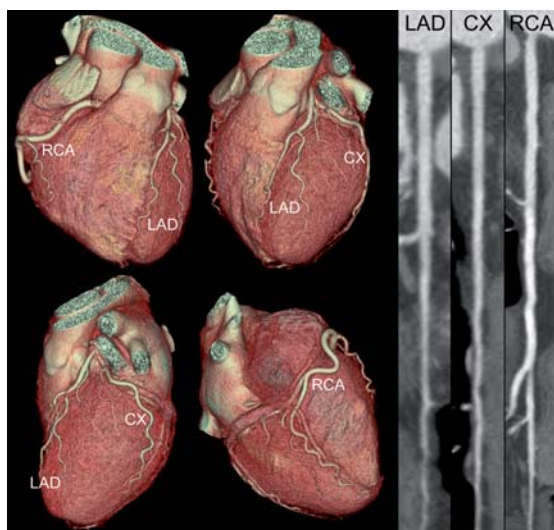
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A 53-year-old woman with hypertension, dyslipidemia, nicotine abuse, and a positive family history of coronary artery disease (CAD) was referred for cardiac work-up. The patient's history revealed no evidence for CAD, but cardiac stress testing on a treadmill ergometer disclosed ST depression over > 3 min at a heart rate of 150 bpm. The patient was subsequently referred to computed tomography coronary angiography (CTCA). A low-dose CTCA protocol was performed on a LightSpeed VCT XT scanner (GE Healthcare), using prospective electrocardiogram (ECG) gating [1]. The smallest X-ray window was chosen (only 75% of the RR cycle); tube current (450 mAs) and tube voltage (100 kV) were adapted to the body mass index (22.2 kg/m<sup>2</sup>), resulting in an effective dose of 1.4 mSv, as calculated from the product of the dose-length product and a conversion coefficient for the chest ( $k = 0.017 \text{ mSv/mGy} \times \text{cm}$ ) [2]. A single dose of 2.5 mg sublingual isosorbide dinitrate was administered prior to CTCA scanning; no  $\beta$ -blocking medication was given. During the scan, the patient had a mean heart rate of 48 bpm, varying between 46 and 49 bpm.

Image quality of CTCA was excellent in all coronary segments (Figure 1). There were no signs of atherosclerosis and CAD was excluded.

With prospective ECG gating, radiation in CTCA is only administered at predefined time points of the cardiac cycle, rather than throughout the entire cardiac cycle as in the helical mode used so far. Although CTCA has been demonstrated to reliably detect CAD [3–5], CT as a major source of radiation dose has remained an issue of concern [6]. Previous CTCA studies have reported estimated radiation doses of up to 21.4 mSv without the use of the ECG-pulsing technique [7] and down to 9.4 mSv with the use of ECG pulsing [8]. Our technique described here now allows a tremendous reduction of radiation dose down to 1.4 mSv. This case indicates that low-dose CTCA with prospective ECG gating is feasible with excellent image quality and low radiation exposure in dedicated patient populations.

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**Figure 1.** Low-dose CTCA images of the left anterior descending artery (LAD), the circumflex artery (CX), and the right coronary artery (RCA) rule out the presence of CAD.

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