Rising utilization of coronary CT angiography across Europe over the last decade: insights from a large prospective European registry

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Background/Introduction: The recently updated 2019 ESC guidelines for the diagnosis and management of chronic coronary syndromes endorse the use of coronary computed tomography angiography (CCTA) for exclusion of obstructive coronary artery disease in patients with a low clinical likelihood (Class I, LOE B). Higher demand for CCTA requires broad availability, inevitably involving smaller healthcare providers, such as non-academic hospitals and private practices. Nevertheless, most published data on CCTA image quality and safety rely on exams performed in high-volume academic centers, and little is known about CCTA in non-academic settings.

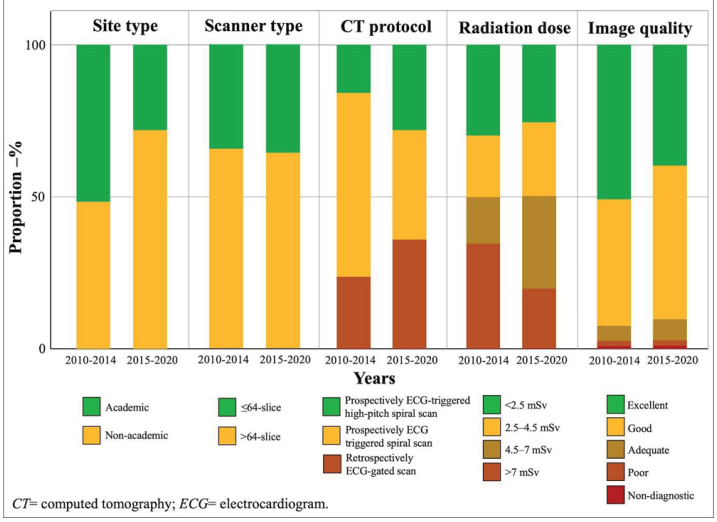
Purpose: To investigate the utilization of CCTA across Europe over the last decade, focusing on differences between academic and non-academic centers.

Methods: We included patients with stable chest pain and suspected coronary artery disease (CAD) who received CCTA and were included in the European Society of Cardiovascular Radiology MR/CT registry 01/2010–01/2020. We compared CT equipment, image quality, radiation dose, the incidence of periprocedural adverse events, patient characteristics, and CCTA findings between academic (high volume university hospitals) and non-academic centers (non-academic hospitals and private practices).

Results: Overall, 64,317 patients (41.2% women; age 60±13 years) from 212 sites across 19 European countries were included. Academic centers submitted most cases in 2010—2014 (51.6%), whereas non-academic centers accounted for 71.3% of records in 2015–2020. While non-academic centers used less advanced technology, radiation dose remained low (4.54 [interquartile range (IQR) 2.28–6.76] mSv) with a 30% decline of high-dose scans (>7 mSv) over time. Diagnostic image quality was reported in 97.7% of cases, and the rate of acute scan-related events was low (0.4%) (Figure 1). From 2010–2014 to 2015–2020, CCTA nearly doubled in patients with low to intermediate pretest-probability, women >50, and 40–60 years old men (Figure 2). CAD presence and extent decreased slightly over time (prevalence: 2010–2014: 41.5% vs. 2015–2020: 40.6%), (multi-vessel disease in those with CAD: 2010–2014: 61.9% vs. 2015–2020: 55.9%; all p<0.01).

Conclusion: CCTA expands rapidly to non-academic centers across Europe, increasing availability while maintaining relatively low radiation dose, high diagnostic image quality, and safety. Broad availability of high-quality CCTA is essential for a successfully implementation of the recently updated guidelines for the diagnosis and management of chronic coronary syndromes.

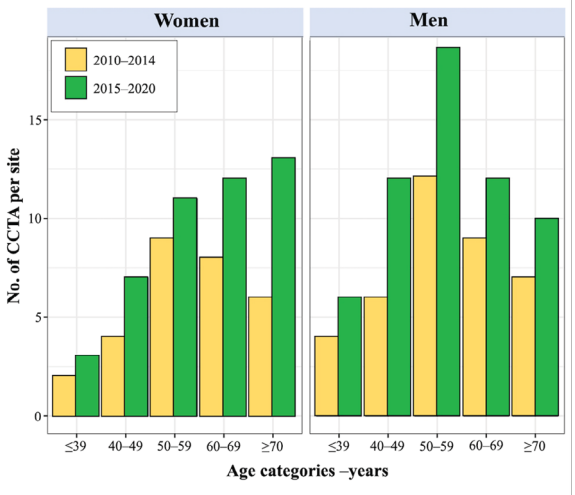
Figure 1: Changes in CCTA utilization between the first and second half of the decade



CT= computed tomography; *ECG*= electrocardiogram.

Changes in CCTA utilization

Figure 2. CCTA across age and sex strata



Number of CCTA increased in all patient groups, but particularly in women over 50 years of age and 40–60 years old men. *CCTA*= coronary computed tomography angiography.

Changes in patient characteristics