Coronary Computed Tomography Angiography: A New Paradigm for the Assessment of Coronary Artery Disease in the Brazilian Public Health System?

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Short Editorial related to the article: Cost-effectiveness and Budget Impact Analysis of Coronary CT Angiography in the Brazilian Unified Health System

For decades, Cardiology sought noninvasive methods capable of identifying patients with significant coronary stenoses. From exercise testing to stress cardiovascular imaging, the paradigm of myocardial ischemia became established as the central element for prognostic stratification and decision-making in coronary artery disease (CAD).[1] In recent years, however, technological advances in computed tomography have made it possible to noninvasively visualize coronary anatomy with a level of image quality previously achievable only with invasive coronary angiography.[2] For many, however, this new method seemed difficult to reconcile with the prevailing paradigm, compounded by concerns that the anatomical identification of stenoses might trigger an oculostenotic reflex and a consequent increase in coronary interventions.[3]

The evidence, however, followed a very different course. In patients without known CAD, large trials demonstrated that coronary computed tomography angiography (CCTA), when used as an initial diagnostic strategy, performed at least as well as functional testing and, in some studies, was associated with a reduction in cardiovascular events.[4,5] The feared sustained increase in invasive coronary angiography and revascularization likewise failed to materialize. Subsequent analyses showed that a substantial proportion of the benefit resulted from changes in clinical management, particularly the greater use of preventive therapies after the identification of coronary atherosclerosis.[6] In another clinical setting, among patients already referred for invasive angiography, additional assessment with CCTA was also shown to reduce invasive procedures and their complications.[7]

These findings gained even greater significance in light of the ISCHEMIA trial, a seismic event that challenged the premise that the demonstration of moderate or severe ischemia should necessarily lead to an invasive strategy.[8] A new direction was thus taking shape. CCTA was no longer merely a diagnostic alternative but was becoming established as the initial test for patients with suspected stable CAD. Real-world data reinforce this transition: in the United Kingdom, after CCTA was recommended as the first-line test for stable chest pain, regions with greater increases in its use showed, in an ecological study, steeper declines in cardiovascular and ischemic heart disease mortality, without imaging costs rising beyond inflation.[9]

The economic dimension added yet another argument. Cost-effectiveness analyses suggested that an initial diagnostic strategy based on CCTA could be advantageous compared with traditional functional testing.[10] Economic evaluations, however, are highly context-dependent: costs, infrastructure, and healthcare organization vary substantially across countries. Would these results be transferable to the Brazilian context and, in particular, to the Brazilian Unified Health System (SUS)? This is the question the authors seek to address in the original article "Cost-Effectiveness and Budget Impact Analysis of Coronary CT Angiography in the Brazilian Unified Health System," published in this issue of *Arquivos Brasileiros de Cardiologia*.[11]

The results indicate that, from the perspective of SUS, CCTA may be economically favorable. Compared with the invasive strategy, it was associated with lower costs and greater effectiveness with respect to myocardial infarction, revascularization, and hospitalization. Compared with functional testing, the advantage persisted for myocardial infarction and revascularization, although for hospitalization, the lower expenditure was accompanied by a slight reduction in effectiveness. According to the authors' projections, the adoption of CCTA could generate cumulative savings for the SUS of between R$34 million and R$73 million over five years. The balance remained favorable even in scenarios that included the acquisition of new CT scanners, although these results remain conditional on the assumptions adopted in the model.

Enthusiasm, however, must be tempered with caution considering limitations acknowledged by the authors themselves. The cost estimates, based on official reimbursement rates and national healthcare price registries, reflect the amounts reimbursed by the system and may not represent the actual costs of providing these services. In the absence of national data, the distribution of functional tests and the event probabilities used in the model were derived predominantly

Keywords

X-Ray Computed Tomography; Coronary Artery Disease; Cost-Effectiveness Analysis; Myocardial Infarction; Unified Health System.

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from international trials and may not accurately reflect the Brazilian setting. Because the estimated budget impact derives directly from these inputs, the absolute savings figures should be interpreted cautiously.

Added to this is the regional heterogeneity in the availability of CT scanners, an important obstacle to nationwide implementation of the strategy.[12] Demonstrating cost-effectiveness is only part of the journey. Making CCTA the entry point for the evaluation of stable CAD within the SUS will require defining subsequent care pathways and adequately assessing existing capacity, important challenges in a healthcare system marked by profound regional inequalities.

In this context, the study adds an important piece to a still limited body of national evidence that has recently suggested the economic feasibility of CCTA in the Brazilian private healthcare sector.[11] CCTA as an initial tool for the evaluation of CAD may also be economically viable within the SUS. For decades, we searched for ischemia to infer the presence and significance of coronary disease; today, the ability to directly visualize atherosclerosis is beginning to shift the focus of that investigation. As with paradigm shifts, what is new does not necessarily invalidate what came before; rather, it redefines its place. The challenge is to ensure that this transformation is translated into practice within the SUS, with efficiency and equity.

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