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Coronary artery calcium and the risk of infarction: a method in search for a role?

Pietro Amedeo Modesti

(Ann Ital Med Int 2005; 20: I)

Ischemic heart disease is the leading cause of death in western countries and research on effective strategies to prevent this disease and to identify subjects at risk at an early stage are priorities for the health care system. The review by Ratti et al.¹ published in this issue of the Journal presents the current evidence on the feasibility of using coronary artery calcification, measured by multislice axial computed tomography, as a screening instrument and to predict the risk of coronary atherosclerosis. The latest generation multislice spiral computed tomography instruments are able to carry out an entire scan during the brief period a patient holds his breath, allowing high resolution images of the heart to be obtained with minimal movement artefacts. This method is becoming used in cardiology not only for measuring calcium deposition, but also for monitoring patients undergoing revascularization procedures (after stent implantation or a bypass) and for studying the walls and chambers of the heart.

As far as the measurement of calcium deposits is concerned, autopsy and angiographic data have shown that the coronary artery calcification score is strongly linked to the extent of atherosclerosis. The calcium score can, therefore, be considered an overall marker of the spread of atherosclerosis, useful for identifying those subjects among the general population who are at risk of future events or for evaluating the progression of disease over time in a given individual. The score has also been proposed as a surrogate marker for evaluating the efficacy of medical treatments of atherosclerosis, although this use remains depen-

dent on a demonstration of how much a reduction in calcium translates into a reduction in clinical events.

With an eye to clinical applications, it should be noted that the amount of radiation absorbed by a patient during measurement of coronary calcium by multidetector row computed tomography is about 1.5-5.2 mSv in men and 1.8-6.2 mSv in women, whereas the corresponding amounts during coronary artery angiography are 2.1 and 2.5 mSv². The highest doses are absorbed during angiography performed with multidetector row computed tomography: 6.7-10.9 mSv for men and 8.1-13.0 mSv for women². According to the studies available, this method adds little information for patients who can already be stratified as being at high or low risk of future coronary events on the basis of clinical and traditional factors, although it may be of aid in indicating the aggressiveness of strategies needed in patients classified as having an intermediate risk (10-20% risk of events at 10 years). Here again, the key factor remains the demonstration of inducible ischemia, because a high calcium score does not necessarily indicate the presence of significant stenoses in an individual patient and cannot, alone, be used as an indication for an angiographic examination³.

References

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3. Lau GT, Ridley LJ, Schieb MC, et al. Coronary artery stenoses: detection with calcium scoring, CT angiography, and both methods combined. *Radiology* 2005; 235: 415-22.