EDITORIAL

Coronary Risk Factors and Extension of Ischemic Heart Disease

BEATRIZ BOUZAS, JOSÉ M. VÁZQUEZ-RODRÍGUEZ

The extension of coronary artery disease quantified by invasive angiography correlates with patient's prognosis and with the benefit derived from coronary revascularization. (1) In addition, several published risk scores for the primary prevention of cardiovascular disease, such as Framingham score and SCORE project, may predict the risk of cardiac events according to the presence of coronary risk factors. (2, 3) Nevertheless, the relationship between the extension of atherosclerotic disease and cardiovascular risk factors is less clear.

The degree of extension of coronary atherosclerosis may be assessed invasively in vivo by coronary angiography, a procedure considered the "gold standard" for the diagnosis of coronary artery disease. However, coronary angiography does not allow direct visualization of the arterial wall, as it only detects the degree of luminal stenosis produced by atheromatous plaques. As a result, the real extension of atherosclerotic disease might be underestimated because this technique does not detect non obstructive lesions. The sensitivity of intravascular ultrasound (IVUS) to detect atheromatous plaques is greater than coronary angiography, as it allows a direct visualization of the arterial wall and plaques, even when they do not produce stenosis. (4)

Multislice computed tomography (MSCT) coronary angiography is a non invasive procedure that has evolved greatly over the last years. Coronary 64-slice multidetector computed tomography accurately detects significant coronary artery stenosis compared with invasive coronary angiography, with high sensitivity, specificity and negative predictive value (93%, 96% and almost 100%, respectively). MSCT may also assess the morphology and extension of non stenotic atheromatous plaques. Compared to IVUS, the sensitivity of the method for the detection of segments with plaques is 80-90%, but interobserver variability is high. (7) The accuracy of IVUS is greater than MSCT for the assessment of the atherosclerotic burden in the coronary artery tree; however, as this method is invasive and in a few cases the procedure is associated with complications, the scan is generally limited to the main coronary branches. Image acquisition in MSCT is limited in case of arrhythmias or high heart rates.

The aim of the study by Rodríguez-Granillo et al (8) was to assess the relationship between coronary risk factors and the presence and extension of coronary atherosclerosis by MSCT. The study protocol included 123 patients; 6 patients were excluded (5 with a poor image acquisition and 1 with infiltration of the venous access) and, of a total of 1638 segments assessed, 63 segments (3.8%) were not analyzed due to poor quality of images or moving artifacts. Among the 117 patients included in the final analysis there were an unidentified number of subjects with risk factors and unknown ischemic heart disease, and also patients with established ischemic heart disease (20.5% with previous myocardial infarction and 39.3% with previous angioplasty). The prevalence of asymptomatic patients was 45.3%. Were considered risk factors: age = 65 years, hypercholesterolemia, hypertension, obesity, smoking and previous myocardial infarction.

There was a significant correlation between the number of risk factors and the presence of any lesion, of significant lesions, of multiple non-significant lesions and of multiple significant lesions. These findings are in accordance with previous studies performed with IVUS that showed that the risk of cardiovascular events estimated by cardiovascular risk scores (Framingham score, SCORE project and PROCAM score) correlated well with the atherosclerotic burden in the coronary arteries (9, 10) and with plaque progression in subsequent studies with IVUS. (11) The localization, extension and severity of atheromatous plaques assessed by MSCT are significant predictors of mortality, independently of other traditional risk factors. A normal MSCT is associated with a high negative predictive value for mortality (97.8% to 99.7%). (12, 13)

It might be concluded that greater number of risk factors or higher cardiovascular risk scores are associated with the extension and progression of atherosclerotic disease, leading to a greater risk of clinical events.

MSCT is useful for the detection of atheromatous plaques and for characterizing plaque composition, especially the presence of calcium. Coronary calcium is quantified by the Agatston score, according to the extension and density of calcified lesions. Coronary calcium is an indirect marker of the presence of atheromatous plaque and correlates with the severity and the extension of coronary atherosclerosis. (14) It also predicts cardiac adverse events and provides prognostic information incrementally and independently of

Complejo Hospitalario Universitario Juan Canalejo, A Coruña, Spain
e-mail: beabouzas@hotmail.com

traditional risk factors. (15) In the study by Rodríguez-Granillo, patients with greater number of risk factors had higher Agatston scores, probably indicating a greater extension of coronary atheromatous plaques.

In summary, the results of the study by Rodríguez-Granillo help to explain the relationship between risk factors and coronary events. MSTC might determine the extension of subclinical ischemic heart disease, and the presence of calcium might provide a better stratification of cardiovascular risk, especially in intermediate-risk patients who, according to the results of MSCT, might benefit from preventive measures focused on reducing risk factors. (16)

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