

Importance of Definition and Technique When Using Noninvasive Coronary Angiography to Diagnose Myocardial Bridging. Response

Importancia de la definición y la técnica en el diagnóstico de puentes intramiocárdicos por angiografía coronaria no invasiva. Respuesta

To the Editor,

We appreciate the authors' interest in our study.¹ We agree with many of the comments, which are of great help in furthering scientific knowledge of this subject. We would only like to emphasize the following points.

The prevalence of myocardial bridging (MB) varies considerably according to the method used, and this can be explained by the characteristics inherent to each technique. Conventional coronary angiography underestimates the prevalence of MB because the visualization it offers is limited to the vessel lumen, while superficial MB with minimal systolic compression is overlooked. The high incidence obtained in autopsies is likely related to the diagnosis of superficial and very distal MB, which probably have no clinical repercussions. Multidetector computed tomography is an ideal technique because it enables visualization of the coronary artery lumens as well as the artery walls and the neighboring myocardium.^{2,3} It is true that the greater the number of detectors, the higher the sensitivity, which increases the prevalence to values close to those obtained in autopsies. The challenge that remains to be resolved is to demonstrate the causal relationship between MB and the patient's symptoms. Only isolated case reports are available, in which the ischemia detection test was positive and/or surgical treatment of the anomaly resolved the symptoms.⁴ If the relationship between MB and the symptoms is uncertain, that between partial MB and the symptoms is even more so. For this reason, our study included only MB in which the artery was completely surrounded by myocardium in axial images and multiplanar reconstructions.

All patients included in our study consulted for chest pain. We had no control group and we did not evaluate the presence of systolic compression. Therefore, it was impossible to analyze the relationship between the anatomic characteristics of MB (longitude, depth and degree of systolic compression) and the appearance of symptoms.

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Carotid Intima-media Thickness and Morbidity and Mortality in Spain: A Definitive Prospective Study Is Needed

El grosor íntima-media carotídeo requiere un estudio prospectivo de morbimortalidad en España definitivo

To the Editor,

We have read with interest the article entitled “Carotid Intima-media Thickness in the Spanish Population: Reference Ranges and Association With Cardiovascular Risk Factors”¹ published in the *Revista Española de Cardiología*, and consider that the questionable aspects of this determination continue to outweigh its utility in cardiovascular prevention. The authors demonstrate a very weak correlation with cardiovascular risk factors, which is strongest for age, followed by high-density lipoprotein cholesterol. We feel that the results of this study warrant several considerations. The first is that the European Society of Cardiology's guidelines for cardiovascular disease prevention specify that the detection of subclinical vascular disease helps to improve estimation of cardiovascular risk in intermediate risk patients.² Moreover, these results are not substantiated by specifically designed, randomized, prospective trials, and thus do not reach a level A recommendation, although they do attain level B. The only two techniques that receive a class

Ila recommendation are assessment of carotid intima-media thickness (IMT) and the ankle-brachial index.

Secondly, measurement of carotid IMT has 3 key limitations. Firstly, its independent predictive value is fairly low and this technique is practically useless in the reclassification of individual risk³; secondly, progression of IMT does not correlate with an increase in the incidence of cardiovascular events.⁴ Thirdly, drug-induced regression or stabilization is not associated with reductions in the complications rate.⁵ Some of these aspects are shared with the ankle-brachial index, although the latter has some strong points, such as its independent predictive value when its values are abnormal, even in the absence of clinical evidence of claudication,⁶ and its additive role in the presence of other vascular lesions⁷ or even in combination with advanced age.⁸ Moreover, these findings were reported in a Spanish population.

A final question is to consider what carotid IMT assesses: cerebrovascular involvement or the total atherosclerotic burden? Risk factors have a differential effect on the development of complications in distinct areas, given that hypertension and smoking confer a greater risk of stroke,⁹ whereas lipids and diabetes mellitus are associated with a higher risk of ischemic heart disease.² The results of Grau et al.¹ appear to indicate that carotid IMT reflects the total atherosclerotic burden because of its association with age and high-density lipoprotein cholesterol, one of the major determinants of acute coronary syndrome in our patient

population.¹⁰ This study provides relevant data, but we feel that a prospective study in Spain is still required to clarify the true value of carotid IMT measurement in the field of cardiovascular prevention in our general population.

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Predictors of Carotid Intima-media Thickness

Predictores del grosor íntima-media carotídeo

To the Editor,

We have read the interesting report of Grau et al.¹ on reference values for carotid intima-media thickness in the Spanish population and their association with cardiovascular risk factors. In their study, involving 3161 patients of both sexes, the authors found that the major predictors of carotid intima-media thickness were age and pulse pressure, as well as smoking in men and high-density lipoprotein cholesterol in women.

Aging is accompanied by atherosclerosis, which explains why age is predictive of the carotid intima-media thickness; as the authors point out,¹ the association of smoking in men is explained by the higher prevalence of this habit in male patients (24.2%).

The predictive nature of high-density lipoprotein cholesterol exclusively in women can be explained by the effect of 2 confounding variables that are not considered in the study: abdominal obesity and menopausal status. In men, fat is most commonly deposited in the abdominal region, a phenomenon referred to as android obesity, which is associated with increased insulin resistance.

In insulin resistance, the flow of fatty acids from the visceral fat to the liver is enhanced, resulting in triglyceride accumulation (hepatic steatosis) and an increase in very low-density lipoprotein synthesis. The increase in plasma lipoproteins due to their enhanced formation in the liver raises serum triglyceride levels, a process favored by the reduced activity of lipoprotein lipase, an insulin-dependent endothelial enzyme.²

Hypertriglyceridemia affects the pattern of other lipoproteins by increasing the activity of cholesteryl ester transfer protein, which augments the triglyceride content of high-density lipoproteins particles and the cholesterol ester concentration in very low-density lipoprotein particles.³ Ultimately, low-density lipoproteins become small and dense, allowing them to pass through the vascular endothelium and form atheromatous plaques; in addition, these lipoproteins are taken up preferentially by macrophage scavenger receptors, enabling them to evade the normal mechanisms for their elimination by means of low-density lipoprotein receptors. Triglyceride-rich high-density lipoproteins particles are more easily eliminated by hepatic lipase, which reduces serum high-density lipoprotein cholesterol concentrations.

Another factor that could influence the negative association between high-density lipoprotein cholesterol and carotid intima-media thickness in women is menopausal status.⁴ During menopause, there are profound metabolic and hormonal changes due to a loss of ovarian function and a reduction in circulating estrogen levels. These changes contribute, among other effects, to fat distribution in the abdominal region, increased insulin resistance, and the resulting dyslipidemia. If the prevalence of menopause in the sample analyzed had not been high,¹ the presence of these disorders would have been less marked, which partially explains the higher high-density lipoprotein cholesterol concentrations in women and the negative association with the carotid intima-media thickness observed in this group.

Another factor that could contribute to dyslipidemia and favor atherosclerosis is the chronic low-grade inflammation that accompanies abdominal obesity. Visceral adipose tissue is an important source of proinflammatory cytokines, such as interleukin-6 and tumor necrosis factor-alpha, and high blood