Atheromatosis of the thoracic aorta: its value as a predictor of cardiovascular mortality and cerebrovascular and coronary events

To the Director

I congratulate Dr. Deschle et al. for their work "Atheromatosis of the thoracic aorta: its value as a predictor of cardiovascular mortality and cerebrovascular and coronary events". (1) The demonstration of the clinical value of the presence of complex aortic plaques and its relation with cardiovascular morbidity and mortality in patients with embolism risk is an important scientific contribution in our media, emphasizing its prospective and multicentric design. In this sense, the complex aortic plaques not only indicate a potential embolic source, but also a marker of atherosclerosis. Since atherosclerosis is a diffuse disease of the whole arterial tree, population studies have indicated that there is a correlation between the severity of the atherosclerotic disease in one arterial bed and the affection of other areas. (2, 3) Likewise, an association between carotid atherosclerotic disease assessed by the intima-media thickness and the presence of plaques in the thoracic aorta as a manifestation of a generalized process showing that the bigger aortic plaques are associated with the higher values of intima-media thickness is observed. (4, 5)

From this observational and multicentric study, there are some issues to discuss:

a) As the follow-up was by telephone, how was cardiovascular mortality defined?
b) In the multivariate analysis there is no age-related data, coronary or cerebrovascular antecedents. It is surprising that they are not significant at least in the multivariate analysis.
c) Likewise, it is not clear if time variable was analyzed in the multivariate by Cox test.
d) Even though the CI 95% of OR is not observed in the multivariate analysis of the group referred due to endocarditis and in the one excluded by study of embolic source, it calls the attention that the OR is higher in these two groups compared with the global result. Will it be derived from a potential risk of death or embolic periprocedural events in patients who were operated on for endocarditis?

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Author's reply

I appreciate Dr.Baratta's interest and the concepts stated. As it was expressed in the work, the follow-up of the patients was made by a telephone interview based on a form already prepared. We considered death of cardiovascular origin that one occurred in the context of a coronary or acute cerebral event or if it followed a surgical or percutaneous revascularization procedure. In some doubtful cases, we consulted the medical histories.

Our work was motivated after Meissner et al publication in 2004. Our study, unlike that one, did not include healthy individuals, but those patients who were referred for a transesophageal echo and, as a consequence of that, with more prevalence of coronary disease and relatively homogeneous in age.

It is important to mention that the median was 67 years and the interquartile deviation of 9 years. Therefore, we would not find significant differences in age or pathological antecedents. It was not our purpose to compare patients of different age groups or with different pathological antecedents or with a healthy control group. The sample taken would not have been the adequate for such purpose.

Concerning the group of patients referred due to suspected endocarditis, we think that among them there were fewer patients with vascular disease so this can justify the differences among groups, increasing the impact of aortic atheromatosis.

Héctor A. Deschle, M.D., MTSAC

"Normal trabeculation, hypertrabeculation or non-compacted myocardium": A very difficult diagnosis

To the Director

I would like to congratulate Dr. Deviggiano et al. for the excellent work about the diagnosis of non-compacted cardiomyophaties (NCC). (1) The essential value of the work is that for the first time in our media the measurement of the trabeculated mass versus the total ventricular mass was used. The diagnosis through echocardiography, multislice computed tomography (MSCT) and cardiac magnetic resonance (CMR) has difficulties when using echocardiographic criteria based on the existence of two layers of

myocardium or in the profusion of trabeculae, as there is not a universal consensus about their values. (2-5) Echocardiographic database suggest that primary NCC is rare. (6, 7) Likewise, 70% of healthy heart autopsies have some degree of non compactness. (8) The prevalence of NCC was estimated in 0.05% of the general population. The echocardiography has some difficulties for the assessment of the apical area and this one usually has non compacted aspect. (9) Thin trabeculations are part of the normal myocardium and the MSCT and the CMR have confirmed the existence of prominent trabeculae in normal myocardium, what makes difficult the differential diagnosis among normal trabeculation, hypertrabeculation and non-compacted myocardium (NCC). We also find hypertrabeculation in several pathologies; cardiomyopathies of all types, fibroelastosis, hypertension, valvular stenosis and in congenital cardiophaties.

Kohli et al. demonstrated the echocardiographic diagnostic difficulties for this disease. (2, 3, 5) Of 199 adult patients under study due to systolic dysfunction, using the three NCC criteria, they found that 78.7% of the patients fulfilled the criteria of Chin et al., 63% the criteria of Jenni and 53.2% the criteria of Stollberger. Using only one of the diagnostic criteria, the prevalence of NCC in this series would have been between 12.1% and 15.6%. We must emphasize that in the normal control group 8.3% of the patients fulfilled some of the criteria used. About 23.6% of the patients of this series satisfied one or more criteria of NCC and, only 29.8% satisfied the three groups of criteria. In conclusion, sensitivity of these criteria is very high and the correlation of the three groups of diagnostic criteria is weak and probably is not very specific, a cause of overdiagnosis. (10)

Petersen et al. studied the diagnostic accuracy of the CMR using the same echocardiographic criteria. Apical and medium segments of healthy individuals had signs of non-compactness (91% and 78% respectively), more common in the anterior apical segment, decreasing in clockwise direction in the others. This was also observed in patients with NCC, so the non compactness areas were common in all kind of patients. Only a relation NC/C higher than 2.3 in diastole made the difference in patients with NCC and those with hypertrabeculated, with a sensitivity, specificity and positive and negative predictive values of 86%, 99%, 75% and 9%, respectively. Jacquier et al. published a new diagnostic method for CMR, which was used by Deviggiano et al. Using the relation of trabeculated mass versus total myocardial mass, this one was three times higher in patients with NCC (32% ± 10%) than in dilated cardiomyophaties (11% ± 4%; p= 0.0001), hypertrophic (12% ± 4%; p= 0.0001) and control group (12% ± 5%; p= 0.0001). A trabeculated mass value higher than 20% of the global ventricular mass predicted the diagnosis of NCC with a sensitivity of 93.7% and a specificity of 93.7%, data of extreme importance. It has the advantage of evaluating the whole ventricle, including the apical and lateral areas and eliminating the problem of partial volumes or isolated view of faces or segments. (11) Dodd et al. demonstrated that the quantity of fibrosis (late enhancement contrast technique) is correlated with the ejection fraction and it would be an independent predictor of it. (11)

The experience of CMR demonstrates that ventricular trabeculation in normal individuals is very variable in quantity, prominence, distribution and localization and the use of the criteria of two layers is inconsistent and not very specific for the diagnosis of NCC. The method that Jacquier proposed and Deviggiano et al. adopted is, perhaps, the closest to the ideal one. There are other morphological and functional evidences that, combined among them, could contribute to the diagnosis. They are: thinning of non compacted myocardium and its inadequate thickening and systolic mobility, systolic-diastolic variation of the relation NC/C, morphologic pattern of trabeculated (spongiform aspect and deep extension with interlacing and fusions) and the existence of a neosurface or neoendocardial layer over the trabeculated (personal observations). The diagnostic difficulty of NCC seems to be in good direction with the use of this new methodology.

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Author's reply

We thank Dr. Horacio Di Nunzio for his interest and comments about our work.

We coincide that there is no universal criterion, because the different groups of work use disparate diagnostic criteria through which they try to make conclusions and find the correct diagnosis of non compacted cardiomyophaty (NCC). NCC has a wide spectrum of manifestation from symptomatic ways which do not need treatment to associated symptomatic ways with ventricular dysfunction able to suffer anticoagulation, collocation of defibrillator and cardiac transplant. (1, 2)

In patients with heart failure, the echocardiography showed elevated sensitivity and low correlation of the three groups of diagnostic criteria. (3) On the other hand, in those patients with preserved systolic function the assessment of the relation between the two layers of the myocardium during systole is difficult. This can lead to the underdiagnosis of NCC.

The measurement of the ratio between the compacted and non compacted myocardium by cardiac MR is not very specific and arbitrary; however, it is the most widespread diagnostic criterion. It is important to mention that the finding of a thin layer of compacted myocardium over the non compactness area helps finding the diagnosis of NCC.

We also agree with Dr. Di Nunzio in that the measurement of the compacted mass and its percentage in relation with global cardiac mass proposed by Jacquier et al. (4) has advantages over the rest of the determinations as it is a clear and easy to use tool, it involves the whole left ventricle and eliminates the problem of isolated view of faces or segments.

As it was stated by Dr. Monserrat, NCC is an entity looking for criteria. (5) A work evaluating in a same population the diagnostic criteria of the NCC with the different modalities of imaging would make clear its use in the diagnostic of this pathology.

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Hypertension treatment with ACE in pregnant and cardiac defects

To the Director

From the work and editorial published in issue Nº 2 of current year of the Journal about enalapril and cardiac defects the question about the mechanism of this complication in the treatment of hypertension in pregnant raised up. (1, 2) Angiotensin-converting enzyme inhibitors (ACE) act on the enzyme that is part of metalloproteinase's family, sharing a prosthetic group with zinc, which carries the metal through a complex chemical bond called chelation. It consists in a molecule with many negative charges that catches in an irrevocable way the metal of positive charge. During the embryonic period in the cardiovascular system there are at least eight metalloproteinase involved in the formation of the heart and the vasculogenesis, and then they are inhibited by other specific enzymes produced by the DNA of the cellules involved in the development. (3) One of the chemical complexes most used in the intoxication due to metals is a chelating agent known as EDTA (ethylenediaminetetraacetic acid) and it is considered potentially teratogenic, situation that may occur with enalapril. EDTA is used for its chelating action on calcium and zinc in the arterial remodelling (4) and in those National Institutes of Health (NIH) of the United States we can find a study to assess its action in coronary disease, known as "Trial of Chelation Therapy for Coronary Artery Disease".

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About the brand names of antihypertensive

To the Director

The cause of this letter is to make some explanations about the editorial signed by Dr. Ana María de Dios, Chief of the Unit of Cardiology of the Hospital de Niños Pedro de Elizalde. (1) As Dr. De Dios states, it is very important to take into account the risks involved in the use of antagonistic agents of the renin-angiotensin system during pregnancy, due to the frequent association with teratogenic effects. It is very frequent to receive pregnant patients and previous hypertensive who are receiving angiotensin converting enzyme inhibitors or angiotensin receptor antagonists. Dr. Alberto Villamil, in an annual meeting of the Argentine Board of Hypertension, some years ago, presented a statistical study which showed an elevated frequency of pregnant patients taking ACE inhibitors entering the Hypertension Unit of the Hospital Dr. Cosme Argerich. On the other hand, Dr. de Dios mentions agents of this family but, unfortunately, includes brand names different from the ones marketed in our country. This fact is understandable as she is a specialist in Paediatric Cardiology, not so familiarized with the use of these agents, her source comes from the American literature and, for this reason, she makes this mistake. I think it would be important to make an explanation as errata in the next publication of the journal.

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Note of the Editor Committee

We thank Dr. Bellido for his comment. In order to clarify the mistake, errata would be published in this edition of the journal.