

Three-dimensional Echocardiography: New Knowledge for Innovative Forms of Working

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From the point of view of this editorialist, the work of Falconi et al. published in this number (1) shows two unquestionably relevant aspects for cardiologists involved in cardiovascular imaging and, naturally, for the patients they manage in their daily practice. Although the authors' work and the comments of this editorial article may seem excessively technical, important practical implications for real routine clinical management can be obtained from them.

Firstly, it should be pointed out that, even if the work is about "three-dimensional" echocardiography, one of the aspects that turn it into a novel study is precisely the use of the fourth dimension, time. Effectively, changes in size and morphology of the left ventricular outflow tract are assessed during the cardiac cycle. This is something that, as the authors comment in Discussion, has been evaluated only in few occasions and with imaging techniques different from three-dimensional transesophageal echocardiography. (2) Moreover, in the few cases in which this technique has been employed, a transthoracic approach at a defined moment of the cardiac cycle has been used, without taking into account its dynamic changes. (3) Therefore, the authors have taken advantage of the better temporal resolution of three-dimensional echocardiography compared to other imaging techniques to appraise the dynamic reality of the left ventricular outflow tract. In addition, among the various modalities of three-dimensional echocardiography, they have chosen to perform this work with the one providing the greatest number of frames per second.

Secondly, the authors show how three-dimensional echocardiography can help to choose the type and size of percutaneous prosthesis to be implanted. It is well known that in the last few years there has been a remarkable development of transfemoral and transapical prosthesis implantation techniques in aortic position. (4) Although, in general, the results of this technique are satisfactory, a non-negligible number of patients present complications and failure of implanted devices. (5) The results of Falconi et al. can be the starting point to search for new measures that will enable safer, uncomplicated and successful procedures in a higher number of instances. The reason for this consideration is that, currently, measure-

ments to evaluate prosthesis type and size are made at a unique moment of the cardiac cycle. In this work, the authors draw conclusions which should serve to generate working hypothesis to look for the best parameters to guide the implant, which, obviously, are not necessarily obtained at the same moment of the cardiac cycle.

The work of Falconi et al. continues a line of research that has provided numerous successful results in different work groups, consisting in assessing the use of three-dimensional echocardiography as assistance for percutaneous intervention of structural cardiopathies. Thus, among many other works, new data has been recently published supporting this diagnostic imaging technique as an almost essential tool for the selection of implantable devices, (6) procedure supervision, (7) and prediction and early detection of implant-derived complications. (8)

Despite the overall success of the article, we cannot avoid mentioning some limitations. The number of included patients is adequate, but is it not a very heterogeneous group of cardiologic pathologies? Would the results be similar if the group had included healthy patients, or at least, patients with more homogeneous pathologies? Until recently, the only available three-dimensional transesophageal probe was the one employed in this study; however, would the results be similar if another type of probe or another type of software were used? It can be gleaned from the authors' text that the acquisition is more complicated, though they could accomplish the study in all the included patients. Are rhythm disorders really an important drawback?

These limitations, however, do not diminish the originality or the importance of the authors' findings.

Conflicts of interest

None declared

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