

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: <http://www.journals.elsevier.com/hellenic-journal-of-cardiology/>

## LETTER TO THE EDITOR

## MRI in all MR patients: Is this the “Gold Standard” approach?



## KEYWORDS

Mitral regurgitation;  
MRI

Mitral regurgitation (MR) can be a real clinical challenge in terms of diagnosis and quantification. Decision making has important prognostic implications for the patient, both in the short and long term. Echocardiography via 2D imaging and Doppler has been a valuable adjunct in the diagnostic and therapeutic approach of patients with MR. However, its application suffers from important caveats, which the clinician should always consider when interpreting its findings. Three-dimensional echocardiography offers new insights in clarifying the complex nature of this disease and addresses the limitations of the traditional 2D method.<sup>1</sup>

Recent guidelines have presented several echo parameters for organic MR and fewer parameters for ischemic MR.<sup>2</sup> This emphasizes the difficulty and controversy with processing the obtained data. In everyday practice, we need to combine a variety of parameters to accurately assess a patient with MR, especially for interventional strategies.

Measurements of the vena contracta width (VCW), regurgitant volume (RVol) and fraction (RF), and effective regurgitant orifice area (EROA) are recommended in patients with more than mild MR. Although these quantitative techniques can be accurate and reproducible in single centers, there can be significant interobserver variability among centers. Additionally, these methods have inherent limitations, which should be considered when interpreting the echo findings. Left ventricular and atrial dimensions, morphological, and several Doppler parameters as well as pulmonary hypertension are the most important parameters for the final evaluation. Moreover, MR is a dynamic phenomenon and, in obscure cases, we need to combine

exercise parameters, such as those derived from stress echocardiography.

With great interest and caution, we have evaluated the prospective multicenter study performed by Uretsky *et al.*<sup>3</sup> According to the investigators, MRI seems to be an accurate measure of the MR severity, whereas echocardiography tends to overestimate the severity. MRI assessment of the regurgitation severity is mainly based on volumetric measurements and correlations between pre- and post-surgery findings. The authors' findings indicate that the two modalities agree more for the moderate disease severity. Still, this interesting paper raises important questions.

We also observed that the authors did not use 3D echo in the evaluation of MR patients. Although 3D echo underestimates volumes compared to MRI, it is more accurate than conventional 2D echo.<sup>4</sup> It would be interesting to observe how the LV remodeling correlations and agreement change when using 3D echo to evaluate post-surgical volumes. Moreover, 3D imaging is particularly helpful when there are multiple or complicated jets. With the evolution of novel software, 3D PISA can be accurately measured while avoiding geometrical assumptions. In addition, the 2D TEE imaging technique was used in some patients. Keep in mind, however, that TEE is the ideal technique for depicting the mitral valve morphological characteristics without providing information about the functional aspect of the MR severity. In this context, 3D TEE could offer better anatomic orientation and delineation, providing valuable insights into the mechanism of the disease.<sup>5</sup> Moreover, because the TEE procedure is usually performed with conscious sedation, one should acknowledge the impact of the pharmaceutical sedation agents on the hemodynamics, which in turn influences the assessment of the MR severity.

The authors state with exaggerated confidence that we tend to send too many patients to the operating theaters when we base our decisions on echo findings. It is very difficult to realize that a very high percentage of patients, who were initially characterized as having mild MR, had severe MR when assessed by MRI. As clinicians, our experience shows that echo correlates well with the symptom severity. Therefore, we

Peer review under responsibility of Hellenic Society of Cardiology.

<http://dx.doi.org/10.1016/j.hjc.2016.11.015>

1109-9666/© 2016 Hellenic Society of Cardiology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

cannot easily misdiagnose a symptomatic patient as having mild MR when his or her clinical presentation suggests otherwise. The discordance between echo and MRI observed when assessing the severity of MR in a high percentage of patients is truly concerning. According to the authors' findings, there is a significant discrepancy in patients categorized as either having severe or mild MR, while it would seem more reasonable to observe discordance in patients with moderate severity. In the discussion section, the authors state that Gelfand *et al.* concluded MRI shows MR to be less severe than echo.<sup>6</sup> Therefore, what does MRI truly offer, more sensitivity or more specificity, compared to echo?

Considering that MRI data are actually the "gold standard", what do the authors suggest for use in clinical practice? Should we change our clinical practice and implement MRI in all MR patients? Where are the prospective data on patient outcomes using MRI as the main diagnostic tool? Why, based on this small prospective study (102 patients), do we have to feel uncomfortable with a "high percentage of errors" in our clinical practice? How easy is to discard all our previous experience and accept, without obvious and convincing evidence, that all our previous experience with the MR approach is based solely on over-estimation of the disease? We do not think so....

### Conflict of interest

None.

### References

1. Aggeli C, Felekos I, Kastellanos S, et al. Real-time three-dimensional echocardiography: never before clinical efficacy looked so picturesque. *Int J Cardiol.* 2015;198:15–21.
2. Vahanian A, Alfieri O, Andreotti F, et al. Guidelines on the management of valvular heart disease. *Eur Heart J.* 2012; 33(19):2451–2496.
3. Uretsky S, Gillam L, Lang R, et al. Discordance between echocardiography and MRI in the assessment of mitral regurgitation severity a prospective multicenter trial. *J Am Coll Cardiol.* 2015;65:1078–1088.
4. Jenkins C, Bricknell K, Chan J, Hanekom L, Marwick TH. Comparison of two- and three-dimensional echocardiography with sequential magnetic resonance imaging for evaluating left ventricular volume and ejection fraction over time in patients with healed myocardial infarction. *Am J Cardiol.* 2007;99: 300–306.
5. Aggeli C, Bellamy M, Sutaria N, Stefanadis C, Nihoyannopoulos P. Real-time 3-dimensional transoesophageal echocardiography: an indispensable resident in the catheter laboratory. *Hellenic J Cardiol.* 2012;53(1):1–5.
6. Gelfand EV, Hughes S, Hauser TH, et al. Severity of mitral and aortic regurgitation as assessed by cardiovascular magnetic resonance: optimizing correlation with Doppler echocardiography. *J Cardiovasc Magn Reson.* 2006;8:503–507.

Constantina Aggeli, MD, PhD, FESC \*

Ioannis Felekos, MD, PhD

Dimitris Tousoulis, MD, PhD, FESC, FACC

First Cardiology Department, University of Athens Medical School, "Hippokratation" Hospital, Athens, Greece

\*Corresponding author. Ass. Prof. Constantina Aggeli, MD, PhD, FESC, 114 Vasilissis Sofias, 115 28, Hippokratation Hospital, Athens, Greece. Tel.: +30 213 2088099; fax: +30 213 2088676.

E-mail address: [dina.aggeli@gmail.com](mailto:dina.aggeli@gmail.com) (C. Aggeli)

7 August 2015

Available online 24 November 2016