Reviewer's report

**Title:** Real-Time Three-Dimensional Transthoracic Echocardiography in Daily Practice: Initial Experience

**Version:** 1  **Date:** 8 January 2012

**Reviewer:** Denisa Muraru

**Reviewer's report:**

Major Compulsory Revisions:

The Authors have evaluated 320 subjects (normals and patients with various cardiac diseases) by 2D and 3D transthoracic echocardiography and, by comparing partially the findings against various methods (magnetic resonance for chamber volumes, balloon sizing for atrial septal defects, 2D TEE for mitral valve prolapse and heart thrombi), they conclude that 3D echocardiography provides substantial benefit in comparison with 2D approach, justifying its routine use.

There are several limitations that Authors should address; even so, many of the study findings come to confirm what is already known about the clinical benefits of 3D echocardiography (also recently overviewed by Lang R, Badano L et al. J Am Soc Echocardiogr 2012).

**Aims**
- The study is mainly descriptive and no clear-cut hypothesis emerges from the manuscript.
- The aim seems ambiguous: the title and Introduction (pg 5) suggest a description of the Authors' initial experience with 3D echocardiography, the Abstract talks about a study comparison with 2D echocardiography in terms of “feasibility, reproducibility and additional value” and in the Discussions (pg 17) the aim is “to standardize the technique”. Please clarify.

**Methods.**
- More technical details should be provided about 3D echocardiography: the acquisition modalities (real-time, zoom, full-volume etc) used for the analysis of each structure and number of stitched cycles for 3D volumes, volume-rate range; this is also because one of the two equipments used for 3D data set acquisitions belongs to the first-generation 3D platforms.
- As stitched 3D volumes are mandatory for chamber quantification purposes, it is intriguing that no patient was excluded on the basis of arrhythmias/ stitching artifacts/inability to breathhold in a series of “consecutive” patients. In this view, the modality of enrolment (page 6, 1st paragraph: “pre-selected” and “selected” vs “consecutive”; page 6, 3rd paragraph: “only 1 cardiac structure was selected for acquisition and analysis”), and the selection criteria used for each structure are also unclear, therefore feasibility data is difficult to judge.
- Bland-Altman analysis should be preferably performed for comparing 2D, 3D echo and MR results, instead of comparison of the means.

- 2D volumes calculation for RV quantitation are no longer recommended (Rudski JASE 2010).

Results.

- Some methods used as comparators have limitations (2D TEE for atrial septal defect and mitral valve prolapse) and/or applied in few patients, while for others no third method was used (valve diseases, protheses, ventricular septal defect, tumors etc). Only patients having evidence of thrombus by 3D transthoracic echo underwent 2D TEE for confirmation (page 16, 2nd paragraph). Therefore no definite conclusion can be drawn from these results about the clinical utility of 3D and its superiority vs 2D echo.

- Reproducibility was reported only for the assessment of thrombi

- 25% patients were excluded due to poor image quality, however during analysis the "LV endocardial borders were not visualized" in other 14% (page 10, 2nd paragraph). Please clarify.

- The r value for the correlation between 2D LVEF and 3D LVEF: 0.87 or 0.94? (page 10, 3rd paragraph)

- Page 11, 1st paragraph: what were the findings after CRT implantation?

Several statements in Results/Discussions/Conclusions are not supported by the evidences provided (ex. pg 18, 1st paragraph “assessment of LV functions was…reproducible”; pg.18, 2nd paragraph “RT3D-TTE was helpful…to judge the immediate response to CRT”; pg 19 “RT3D-TTE provided…accurate measurement of MVA in 20 pts with rheumatic mitral stenosis” and so on)

Conclusions. Should be moved in the first paragraph of Discussions, and a concise conclusion in concordance with the evidence provided should be formulated.

Quality of the manuscript. Additional work to add more clarity is required.

Minor Essential Revisions:

- Table 1: 300 patients instead of 320 are stated.
- Table 2: nr of patients, statistical significance (p value) should be specified
- References 5 and 13 are similar

Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests