Reviewer's report

Title: Mitral Valve Analysis Adding a Virtual Semi-Transparent Annulus Plane for Improved Visualization of Prolapsing Segments

Version: 2 Date: 10 April 2015

Reviewer: Romain Capoulade

Reviewer's report:

This paper presents elegant data on the usefulness of 3D virtual semi-transparent annulus plane to visualize mitral valve prolapse. Authors reported a good agreement of 3D VSAP compared to phantom and surgeon assessment.

I have several issues that authors need to address.

Major Compulsory Revisions

1 – Authors recently published a feasibility study (ref #16 of the present study). In this previous study, 40 patients were analyzed (in which 35 were referred to surgery) but in the present paper, only data on 10 patients were reported. Could you explain why you only present data on a subset of patients rather than on the complete cohort prospectively recruited (similar inclusion criteria, similar acquisition protocol between these 2 studies)? This point raises issues regarding generalization, technical pitfalls, etc.

2 – The “improving” visualization of segments with 3D VSAP compared to “standard” evaluation is not demonstrated. The small number of patients in this proof-of-concept study limits the ability to clearly demonstrate this point, but authors have to acknowledge this point and modify the title and conclusion of the manuscript accordingly to avoid misunderstanding.

3 – In addition to correlations presented in fig 3 and 4, authors have to present Bland-Altman analysis to test agreement between 3D VSAP indices and direct measurements. The data regarding ratio (fig 4) should also be implemented by presenting a comparison of the absolute value of each diameter.

4 – Authors stated there was good agreement between Observer I and II vs. surgical findings, but they have to present Kappa value.

5 – Regarding statistical section, did you check the normality of variables? Authors should implement the statistical section and clearly present all statistical tests used in this study.

Minor Essential Revisions

6 – In the legend of fig 3 and 4, please define the equation and r value reported on figures.

7 – The regression equations reported in the text (results, first paragraph) vs. figure 4 are different: the regression coefficient is 0.07776 in the results section
and 0.7776 on the fig 4.

8 – In fig 4, you presented a regression coefficient significantly different from 1 (i.e. ideal correlation). Could you explain/discuss this point, also with regard to Bland-Altman plots?

9 – Update the reference of your recent feasibility paper (ref #16), the manuscript is now published.

10 – You stated in the method that 3D acquisition was blinded to the 2D recordings. How did you do a blinded acquisition?

Discretionary Revisions

11 – You presented data on non-planar angle in the phantom analysis. Could you do the same analysis in patients?

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I have conflict of interest to declare