Reviewer’s report

Title: 3D vena contracta area after MitraClip© procedure: precise quantification of residual mitral regurgitation and identification of prognostic information

Version: 0 Date: 14 Oct 2017

Reviewer: Eustachio Agricola

Reviewer’s report:

General comments

The topic of the study is interesting and potentially clinical useful. There are several issue that should be addressed by the authors in any revisions.

Specific major comments

The title should be changed.

Percutaneous mitral valve repair nowadays means different percutaneous MV repair approaches. In this study only MitraClip procedure was done. Therefore "Percutaneous mitral valve repair" should be changed with "MitraClip Procedure".

Methods, paragraph "Echocardiography. The MR was quantified using a multiparametric approach. However, I guess that MR then was graduated in terms of severity. In this paragraph the authors should report the scale (absent to severe, I to IV) of graduation according to the multiparametric approach. Indeed, they used the scale I to IV in results section and in table IV.

From a technical point of view: what was the minimum frame rate accepted for the analysis? Had all 3D color-datasets used for the analysis a FR > 10 fs? Please point out it in the methods.

Which portion of the jet was took into account for planimetry? Was the aliasing portion excluded? For example, as shown in the figure 1, was the red part of the jet excluded or not in the planimetry?

It is important to know the reproducibility and the feasibility of 3D VC. The same data should be provided for 2D standard parameters. In this way we could know the difference in terms of feasibility and reproducibility among different methods as well. Please provide them.

In addition the last point could be one of the strength of the study and a potential application of this method in this field.

The study population was too small to achieve strong conclusion. This issue should be pointed out in the limitations of the study.
Page 10, lines 32-37 and figure 2 "Median VCA was 0.19 (0.09;0.42). In the 15 subgroup of patients with follow-up 3D-TEE, procedural and follow-up VCA did not vary (p=0.999, Figure 2)". This sentence is not clear. The term "procedural" is inappropriate here and it is inconsistent with figure 2. It should be clarified if the term post PMVR is referred to immediate post-procedural result or pre-discharge result. Please specify and make it consistency between text and figure.

Regarding the relation between the entity of reduction of 3DVC and the clinical improvement. The find that more the reduction of 3DVC and less the clinical improvement is though not statistical significant seems quite strange. However, I believe that one of the explanation of this result could be that 3DVC is a semiquantitative parameter which doesn't measure the real regurgitant volume. The true parameter which correlates with clinical outcome is the regurgitant volume, if the authors measured the RV and correlated it with the clinical parameters probably different results would be came out.

At this purpose could be interesting to make the same analysis not only using 3DVC but also the standard 2D multiparametric approach (RV, ordinal scale derived from multiparametric approach). In this way we really know the potential clinical value of 3DVC over 2D parameters.

Discussion: the point 1 and 4 of the first paragraph in page 13 are actually inconsistent with the results of the study.

To state that the authors have to solve before the following issues: 1. feasibility and reproducibility of 3DVC; 2. the grading scale of MR by 3DVC.

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