Reviewer’s report

Title: Transcatheter MitraClip Repair Alters Mitral Annular Geometry – Device Induced Annular Remodeling on Three-Dimensional Echocardiography Predicts Therapeutic Response

Version: 0 Date: 06 Nov 2019

Reviewer: Maurizio Tusa

Reviewer's report:

This study is very interesting as it focalizes for the first time the potential role of the annular geometry changes in predicting the therapeutic response of Mitraclip procedure.

I think some points deserve to be analysed:

1) it is not specified if the study design is retrospective or prospective and what kind of clip has been used (NTr or XTr).

2) It could be also useful to know if the worse results are correlated with the use of more than 1 clip. According to Your findings in which a greater geometrical remodelling caused by the device correlates with sub-optimal results, the use of more than one clip should be associated with more severe residual MR.

3) It could be interesting to have some data about the modifications of anterior and posterior leaflets'angle and non-planar angle.

4) The study population is primarily degenerative and the Authors specified that leading pathologies were prolapse, annular calcification and valve thickening. It may be useful to know the specific criteria used for patients'selection: had the Authors included anatomical characteristics beyond the EVEREST criteria known to be associated with less favourable results (complex prolapses, excessive valve thickening or calcifications)?

5) It is not specified the acutely post-procedural results about residual MR associated with geometrical annular modifications. This point has relevance in order to know if the sub-optimal results shown at the follow-up are related to the adverse remodelling caused by the clip over time, as the Authors have speculated, or if it is the consequence of some basal valvular and ventricular anatomical features.

6) The Authors' hypothesis about the unfavourable remodelling directly caused by the clip through the augmented leaflet stress immediately adjacent to the device as well as LV myocardial stretch adjacent to the mitral annulus is not fully sharable. It is indeed in contrast with the recent favourable clinical experience with the use of XTr devices. These devices notoriously grasp a wider amount of leaflet tissue, then applying a greater force on mitral valve apparatus.
7) Considering that one of the study aim is to find some pre-procedural anatomical hallmarks in order to predict MitraClip therapeutic response, it could be useful to suggest some cut-offs about LV volume and mitral annular size.

8) In the discussion the authors hypothesize a causal correlation between mitraclip induced alterations on annular geometry and suboptimal result during follow up. These indexes are calculated from basal annular area and circumference, which the authors demonstrated to be independently associated with poor response. Therefore these findings may be incidental and concomitant.

In order to establish an independent and causal correlation, the authors should identify on ROC analysis a cutoff of Delta annulus area or delta annulus circumference which can predict poor response as well as to include the variable "Delta annulus area" or "delta annulus circumference" in univariate and multivariate analysis for the prediction of poor response.

9) An independent predictive role of mitral annular area, annular circumference, anteroposterior diameter for poor response was demonstrated. It would be useful to provide cutoffs of these variables.

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