Reviewer’s report

Title: Determination of mitral valve area with echocardiography, using intra-operative 3-dimensional versus intra- & post-operative pressure half-time technique in mitral valve repair surgery

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Reviewer: Rocío García Orta

Reviewer’s report:

1. I think the research question posed by the authors is well defined, and I consider this question interesting because of the paucity of data in the literature about it.

2. The methods are appropriate and well described. They would be enough to replicate the work.

3. The data are sound and well controlled.

4. The manuscript adheres to the relevant standards for reporting and data deposition.

5. Discussion and conclusions are well balanced and adequately supported by the data, with the limitation of the small number of patients in the study.

6. The title and abstract describe adequately the findings of the research.

7. Writing is acceptable.

Some comments:

There is little information available on the best method to estimate mitral valve area and to detect acute mitral stenosis immediately following mitral valve (MV) repair. Most of the information comes from case reports or small series of patients (1,2,3). Systematic reports about perioperative mitral valve area measurement in larger cohorts of patients have not been published. That is why it is not clear which echocardiographic indices of mitral stenosis (MS) severity provide reliable information in the intraoperative setting, since specific echocardiographic criteria for the diagnosis of acute MS after MV repair have not been well established.

Some studies have shown that changes in MV orifice geometry and chamber compliance after cardiopulmonary bypass (CPB) or mitral percutaneous valvuloplasty can influence the intra- and postoperative echocardiographic evaluation of MS (2,4).

3D TEE Echocardiography is an increasingly used intraoperative technique during mitral valvuloplasty and mitral valve repair. In primary native mitral stenosis, 3d echocardiography is considered the gold standard of MV area estimation by some authors. However, there is no data about its reliability in identifying acute mitral stenosis in the intraoperative setting immediately after
mitral valve repair.

Major compulsory revisions:
I think the following points should be explained by the authors in their article:
1. From 107 patients between April 2011 and March 2012, there were 57 patients without 3d study. Was it because of poor image quality or because the operator didn’t apply this method for some other reason? Which was the criteria applied to select these patients?
2. Did any of the 26 3d echo studies have non interpretable or bad quality images?
3. The authors should explain the reasons of the high variability of the 3d method valve area measurement: limited image quality? Differences in the selection of the gain by the different observers?
4. I think it must be stressed that the study doesn’t show that 3d method is inaccurate for the determination of valve area because there is no gold standard to compare it with. Accuracy of THP measurement of mitral valve area has been demonstrated empirically for rheumatic mitral stenosis, but not for non stenotic valves or for other etiologies as after mitral valve repair, and therefore it shouldn’t be considered the reference method in this setting. In fact, some studies have found that immediately after valve repair, THP underestimates mitral valve area compared to 2d planimetry, which is usually considered de reference method in mitral valve area estimation (2).
4. I don’t consider pulsed Doppler the most appropriate method in the measurement of THP. The guides in valve stenosis (4) recommend the use of continuous Doppler unless there is something that prevents its use. Pulsed Doppler measurements can be variable depending on the sample volume location.
5. In some studies, PHT was compared to other methods to detect significant mitral stenosis after repair, and for example, transvalvular gradient showed better accuracy than PHT (6). The most frequently reported reason is THP dependence of net atrioventricular compliance. But the present study shows good correlations between intra and postoperative THP. Do the authors find an explanation to the differences with respect to other studies?
6. Despite the paucity of studies analyzing the problem of mitral valve area measurement after surgical repair, I think that some of the studies mentioned previously are directly related to the subject of the article and should be included in the references.


Level of interest: An article of importance in its field

Quality of written English: Acceptable

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