**Author's response to reviews**

**Title:** A new shape for an old function: lasting effect of a physiologic surgical restoration of the left ventricle

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**Author's response to reviews:** see over
Dear Editors,

I would like to submit the revised version of the research article:
“A new shape for an old function: lasting effect of a physiologic surgical restoration of the left ventricle”.

I appreciated the expertise comments of the Reviewers, and I tried to address them in the text and I comment here.

Reviewer Pino Fundarò.

Thank you very much for your comments.

a) I included in the text a more detailed description of the restoration of the new apex.
I changed the text as follows:
“The new apex is localized at the end of necrotic tissue of the old apex (usually more postero-lateral than the anatomic one) and at the joining point of the two suture lines (septal and lateral) along the patch.”
The point is to eliminate the rounded apex due to the necrosis of myocardial tissue and so we usually rebuild it more posteriorly (were the myocardium is still normal) according to the extension of myocardial necrosis. It is very important to leave only the functioning myocardium, especially at the apex, otherwise we will have again a dyskinesia in this crucial part.

b) Also in our small series, we reported a recurrence of MR at late follow-up in patients who had it in the preop, so probably the restoration itself is not enough to address MR but in specific cases in which the linear suture lines go close to the base of papillary muscles. We also stressed the importance of keeping ESV <45ml/m$^2$, because we had a steadier status in patients with this value, regardless of the presence of MR. I proposed a specific geometrical study about this issue in the specific STICH trial data analysis working group. In the meanwhile, I prefer to comment as I did in the conclusions:
“a wider indication to repair mitral regurgitation is also required because even mild regurgitation is not surely eliminated by surgical restoration.”
Reviewer Constantine Athanasuleas.

Thank you for your comments. I learned very much from your work about this topic. There are in literature different definition of sphericity index. The most recent one defines this index as the ratio of LV volume to the volume of the theoretical sphere having the measured long axis diameter (Di Donato and the RESTORE group. Left ventricular geometry in normal and post-anterior myocardial infarction patients. J Thorac Cardiovasc Surg 2006;295:s225). The same paper highlights the limitations of this index when applied to the ischemic cardiomyopathy. I did not include this parameter because of its limited use. However it has a very interesting course, as you probably know. I calculated the sphericity value at the four timepoints based on mean values.

For the diastolic SI, the value of preop, FU1, FU2 and FU3 are, respectively:

0.45 0.61 0.60 0.55

For the systolic SI:

0.35 0.41 0.42 0.38

With ventricular restoration, we both shorten the length and reduce the volume of the left ventricle at the same time. On the other hand, the true minor axis that we can reduce with restoration is rarely calculated. So it is reasonable to think that we should find a more accurate index to describe such a complex geometry. From reported data we can note an early increase in sphericity and then a reduction during time. The real change in the ventricle is the shape, so we must interpret these data and adapt them to a more physiologic contraction status. The reshaped ventricle should adapt its volume to the needs of circulation: in this sense we can interpret the increase in diastolic volume during the first year after the operation. But the important is that systolic volume (and sphericity) do not increase as much as the diastolic: so we have a greater diastolic volume and about the same systolic volume, that is, an increased stroke volume and cardiac output.

I do not know if you agree with this thinking. This is an evolving issue in cardiac surgery and the ongoing STICH will probably provide more data than we expect.

I take advantage of your clemency of including this comment in the Discretionary revisions and I would not modify this paper, keeping this study for further reports.

Sincerely Yours,

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