Author's response to reviews

Title: What Parameters Affect Left Ventricular Diastolic Flow Propagation Velocity? In Vitro Studies Using Color M-Mode Doppler Echocardiography

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Eugenio Picano, MD

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Dear Dr. Picano:

It is our pleasure to submit for your consideration the above revised original article that describes the relationships in an in vitro (pulse duplicator) setting of various important hemodynamic parameters to left ventricular (LV) diastolic flow propagation velocity, as measured by color M-mode Doppler echocardiography. Our specific responses to the comments of the Reviewer are attached. We have responded to the comments of the Reviewer and made the changes requested (or explained why we felt we could or should not do so). We have also followed the instructions on the checklist in making this revision.
My coauthors and I hope that our manuscript is now acceptable for publication in Cardiovascular Ultrasound. Should you have any further questions or comments, please do not hesitate to contact me.

Correspondence regarding this manuscript should be sent to me at the address or email address on this letterhead.

Sincerely,

Julius M. Gardin, MD
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Chief, Division of Cardiology
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Comments to the Reviewer

Major Compulsory Revisions:

1. In study limitations the authors mentioned that the position and size of the mitral annulus were fixed during LV filling in their model - in my opinion, this fact represents not only study limitation but it is totally different from normal LV filling conditions when mitral annular motion towards the stationary apex is one of the main factors influencing early diastolic filling period. Based on this fact, the model of LV as described by authors cannot be used for studies regarding LV filling. The authors should resolve this important and very significant limitation of their LV model, if possible.

We agree with the Reviewer that the fact that the position and size of the mitral annulus were fixed in our model represents a limitation of our study since this aspect does not mimic human left ventricular filling. Nonetheless, we feel that the insights derived from our model relative to parameters affecting left ventricular diastolic flow propagation velocity are still important and useful.
2. It is not clear from the methods and results sections under which conditions the investigated parameters were actually studied. More specifically, the hemodynamic variables that were investigated are well described in methods, however, the results section is rather short and the relationships between all parameters and conditions are not straightforward. Namely, it is not obvious what exactly were the baseline conditions: was it transmitral waveform type or LV compliance? Regarding this the results are inexplicit and the authors should explain this in more detail.

Various paragraphs in the Methods section dealing with the specific parameters--e.g., Waveform programming and Hemodynamic variables (see pages 4 and 5)--describe specifically all the conditions of aortic flow duration, as well as mitral waveform shape, stroke volume, heart rate, baseline LV volume, and LV compliance under which left ventricular diastolic flow propagation velocity was studied. The results for these sets of conditions are currently summarized both in the text (on Page 6) and in the Figures.

Minor Essential Revisions

1. abstract, line 4- Vp should be written instead of Up.

   We have made the requested correction.

2. Page 3, line 10- a mistake in grammar: "allowed no to" should be replaced by "did not allow to".

   We have corrected this section of the sentence to state "which allowed us to produce isolated changes...".

3. Page 4- the authors describe that porcine bioprothesis were used for aortic position, however, there are no informations about valves in mitral position.

   On Page 4, Paragraph 1, Line 2, we have clarified the fact that pericardial bileaflet bioprothestic valves were mounted at the aortic and mitral valve sites.

4. The number of correlation coefficient is missing in Figure 5D.

   As noted in the Figure Legend for Figure 5D, the correlation coefficient was $r = -0.56$. 