



SDI FINAL EVALUATION FORM 1.1

PART 1:

Journal Name:	Annual Research & Review in Biology
Manuscript Number:	2013_ARRB_7229
Title of the Manuscript:	Initial insight to effect of exercise on maximum pressure in the aortic root using 2D fluid-structure interaction model

PART 2:

FINAL EVALUATOR'S comments on revised paper (if any)	Authors' response to final evaluator's comments
<p>This manuscript describes a method to compute maximum pressure in the left ventricle as a function of heart rate during exercise. To compute this single number, this method requires:</p> <ul style="list-style-type: none"> - echographic measurements of the aortic valve geometry, - measurement of brachial artery pressure (usually done invasively), - B-mode Doppler flow imaging. <p>These measurements are then used along with a large amount of hypotheses, including:</p> <ul style="list-style-type: none"> - many empirical correlations, - use of a 2D geometry <p>to derive cardiac output from a FSI model. (While cardiac output could in fact be directly computed from the measurements used.)</p> <p>For obscure reasons, the numerically computed cardiac output is then converted to pressure and heart rate using more empirical correlations.</p> <p>Finally, these pressure and heart rates are plotted together to observe the effect of exercise on the derived pressures.</p> <p>This is a summary of what I understood of the methods, which are not clearly described. Furthermore, this seems to me a rather complex, ineffective and useless way of deriving one unique index from three measurements.</p> <p>To be of any use, the method needs to be validated against independent measurements of maximum left ventricular pressure. I personally doubt this validation will be positive, because of the numerous hypotheses underlying the method.</p>	<p>The authors thank the reviewer for the useful suggestion.</p> <p>As you probably know this is the first time that MPLV was assessed based on mechanical relationships. However, the procedure seems long, the steps would be reasonable. Along with this the merit of non-invasive approach should be considered. Needless to say that clinically measuring MPLV would be costly, risky and not easy.</p> <p>As we cited in abstract and conclusion , “Predicted results are in good agreement with values in the literature. The method, however, requires validation by additional experiments, comprising independent quantifications of MPLV.” And in the limitation section, the further study would be considered in the future.</p> <p>Additionally, MPLV is not the only result of our technique. Because of the simple fact that this is numerical method, we perhaps can assess other hemodynamic parameters. The aortic valve with its remarkable cycle of 80 bpm (normally), is always under ventricular pressure. So, attempting to evaluate of that seems necessary. Although, we have faced a soaring level of aortic diseases recently.</p>