

In Response to Describing Right Ventricular Dysfunction: Diagnostic Accuracy Studies and Sources of Bias

To the Editor,

Thangaswamy and colleagues^[1] in their letter have stated that the limitations in our study, Portal venous pulsatility fraction, a novel transesophageal echocardiographic marker for right ventricular dysfunction in cardiac surgical patients^[2] relate to spectrum or selection bias, lack of rater blinding, and limited working definition of positive and negative test results. The issues outlined indicate some latent biases accompanying the clinical special tests and their diagnostic accuracy, in this case, the portal venous pulsatility fraction (PF), that the authors have undertaken.

The reply by the authors for the letter is as follows: The authors have missed to mention the spectrum of cases; however, it was specified during the review process of the manuscript. There were a total of 27 patients included in the study of which 3 patients had coronary artery disease (CAD), 1 patient had CAD with aortic stenosis, 5 patients had severe Mitral regurgitation, 3 patients with severe aortic

regurgitation, 4 patients with severe aortic stenosis, 9 patients with severe mitral stenosis, and 2 patients had (atrial septal defect) ASD. The possibility of spectrum bias could be observed only when most of the patients suffered from mitral valve stenosis which was not true in the present study.

Second, regarding rater blinding, right ventricle (RV) dysfunction was classified based on Tricuspid annular plane systolic excursion (TAPSE) (<15 mm), RV Fractional Area change (FAC) (<35%), and RV Ejection Fraction (EF) (<45%) parameters. If at least two parameters of the three were positive, it was deemed as RV dysfunction. Post comprehensive transesophageal echocardiography (TEE) examination, above RV parameters and corresponding PF of portal vein were assessed. The echocardiographer performing the TEE was not aware of the normal PF and its significance in RV dysfunction patients. However, previous studies have shown a wide range of abnormal PF values, i.e. Shih *et al.*^[3] 43% to 194% and Denault *et al.*^[4] 51% to 100%. Cut off value of PF >45% was obtained only

after computing both normal and abnormal values of RV function parameters with their corresponding PF of portal vein, at the end of the study by constructing ROC curves.

Lastly, to answer their final query, PF >45% had a sensitivity of 92.3%, specificity of 71.4%, positive predictive value of 75%, and negative predictive value of 90.9% for RV dysfunction. The present study had 13 patients (48.15%) with RV dysfunction. PF values quoted by Thangaswamy *et al.*^[1] regarding Shih *et al.*^[3] and Denault *et al.*^[4] of 87.8% and 75.35%, respectively, represent only mean values and not the cut off values. This is to reiterate that cut off values are obtained by constructing Receiver Operating Characteristic (ROC) curve unlike mean values. In addition, in the above studies, RV dysfunction was classified based on the CVP.^[3] In the present study, the more reliable echocardiographic parameters were assessed for RV dysfunction. Shih *et al.*^[3] also report that PF >40% signifies RV dysfunction which is similar to the present study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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