Echocardiographic evaluation of systolic and mean pulmonary artery pressure in patients with pulmonary hypertension

We read with interest the recent article by Pyxaras et al.1 proposing corrected regression equations for improving the echocardiographic estimation of systolic pulmonary artery pressure (sPAP) and mean pulmonary artery pressure (mPAP) in patients with pulmonary hypertension (PH). The authors propose to slightly modify both the sPAP Bernoulli equation and the empirical mPAP equation (mPAP = 0.61 sPAP + 2 mmHg).

Before accepting the authors’ conclusion that their two corrected formulas may be more reliable than previous ones, we would like to make the following comments.

First, the authors only perform correlations between the various formulas and invasively measured PAPs but they did not provide the corresponding mean bias, SD of the bias and 95% CI of the bias. The figures 1 and 2 of the article1 suggest large 95% CI for the biases of the two corrected formulas, and thus questionable clinical relevance. Second, if only PH patients were included in the study, as indicated in the ‘Methods’ section,1 the sensitivity and specificity of the formulas for diagnosing PH cannot be calculated. Thus, how were the sensitivity and specificity of the classical and modified formulas calculated and compared in Table 3 of the article?1 Although not indicated by the authors, there is a possibility that the very few patients with invasive mPAP slightly <25 mmHg (initial sample, figure 1) or with invasive mPAP equal to 25 mmHg (validation sample, figure 2) were considered normal, which is far from a true control group.

Third, echo machines of increasing quality were used from 1979 to 2009 and this may well have biased the proper estimation of sPAP and right atrial pressure throughout the time of the study and thus the relationships under study as well. Our final point relate to the issue of mPAP. Both the redundancy between sPAP and mPAP and the sPAP-derived mPAP formula have been recently documented by our group using high fidelity pressure catheters.2,3 For clarity for the reader, it must be noted that our original formula was incorrectly assimilated to the Bernoulli equation throughout the text, while it simply reflects the mathematical relationship between sPAP and mPAP.2,3 Furthermore, in the ‘Introduction’ section,1 our original mPAP formula was mistakenly attributed to two other groups who did not use the formula in their studies, while surprisingly our studies were not even referenced.

In conclusion, PH is a devastating disease and improving the non-invasive estimation of PA pressure is certainly of crucial importance,1 but further echocardiographic studies are needed before accepting the authors’ conclusions.

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References


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