Echocardiography in Pulmonary Hypertension

To the Editor:

In their well-elicited point-counterpoint editorials in a recent issue of CHEST (June 2013), Rudski and Rich have described some of the advantages and pitfalls of echocardiography in the evaluation of pulmonary hypertension (PH). Although it is true that as practicing physicians and echocardiographers, we find the envelope of tricuspid regurgitation (TR) sometimes hard to evaluate, we have participated in a study on the use of Levovist (Bayer Healthcare Pharmaceuticals), a contrast agent, in the evaluation of systolic pulmonary artery pressure (sPAP) in patients with COPD, a difficult subset of patients to study, with deficient parasternal and apical views.

We were able to elucidate the TR envelope in 49% of patients before contrast injection and 95% of patients after contrast injection. There was also an increase in the severity of TR after contrast. In those for whom a reliable signal was obtained before and after contrast agent, we detected a significant increase in the sPAP values after contrast (44 ± 10 mm Hg vs 56 ± 15 mm Hg, P < .01). To exclude the possibility that the contrast agent per se could cause an increase in the sPAP, we studied 15 patients in the cardiothoracic postoperative unit with right-sided heart catheters before and after the same contrast agent and found no increase in pressures after injection of contrast (35 ± 10 mm Hg vs 35 ± 9 mm Hg, P = not significant).

The discussion of the pitfalls of echocardiography revolves around the severity of estimated TR. Some of these pitfalls can be overcome by better techniques and careful attention to the interpretation of the numbers. As practicing physicians, we find echocardiography indispensable as a screening tool for patients with clinical features suggestive of PH, but it is ingenuous of anyone these days to claim that anything is a gold standard. We also agree that the use of echocardiography as the sole imaging technique to select patients for therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines [published correction appears in Chest. 2012;141(4):129]. Chest. 2012;141(2_suppl):e321S-e350S.


References


Response

To the Editor:

I thank Dr Nobre et al for their insightful comments related to this important clinical issue that was debated. I agree that attention to detail is critical if echocardiography is to be used to estimate pulmonary artery pressures (PAPs). The American Society of Echocardiography right heart guidelines stipulate that it is better to avoid reporting a PAP from a weak and incomplete tricuspid regurgitant (TR) jet than to provide an unreliable value. Agitated saline, air-blood-saline, and Levovist (Bayer Healthcare Pharmaceuticals) contrast agents have been demonstrated to enhance the TR signal, resulting in a much higher feasibility of obtaining a complete Doppler envelope and usually yielding higher values of PAP by simplified Bernoulli equation.

It is challenging, however, to recommend that contrast be used routinely when a strong TR signal with optimal alignment is already present. Similarly, it would be premature to recommend Levovist as opposed to agitated saline or air-blood-saline contrast without comparative data, particularly when considering cost. Jeon et al demonstrated an excellent correlation with agitated air-blood-saline mix compared with invasively measured PAPs. What appears concerning in the consistent increase in PAP estimation with contrast is that when considering the Bland-Altman plots of Fisher et al and Rich et al, there is similar overestimation and underestimation of systolic PAP by echocardiography. If the addition of Levovist consistently raised the PAP estimate, it is unclear how the echocardiography-catheterization relationship would be altered. Accordingly, validation studies would have to be repeated with simultaneous echocardiographic and invasive hemodynamic measures to evaluate the accuracy and clinical utility of echocardiographic contrast agents.

It is evident that the noninvasive measurement of systolic PAP is critical in evaluating patients with dyspnea. The basis of this remains an expert, comprehensive transthoracic echocardiogram that uses all available tools (including contrast when needed) to ensure the most accurate and reproducible PAP estimate.

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