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New and reliable echocardiographic findings useful in the diagnosis of acute pulmonary embolism

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Background: Abnormalities of right ventricular (RV) size and function not only are common in acute pulmonary embolism (aPE); but also correlate with clinical outcomes. The McConnell sign has helped in the echocardiographic identification of aPE patients. However, the presence of RV dilatation and regional wall motion abnormalities might be common findings in patients with chronic pulmonary hypertension (cPH). This study attempted to determine whether objective measures of RV size and systolic function would not only be useful in improving echocardiographic diagnosis of aPE, but also in differentiating aPE from cPH.

Methods: Standard transthoracic echo measures of RV size and systolic performance were retrospectively measured from 15 patients (58 ± 12 years) with confirmed aPE by chest computed tomography and compared to similar data collected from 30 patients (55 ± 14 years) with cPH. Measurements were obtained from the main RV chamber as well as from the RV outflow tract (RVOT).

Results: Estimated pulmonary artery pressures were significantly lower in aPE patients (50 ± 16 mmHg) than cPH (85 ± 26 mmHg, $p < 0.0001$) patients. However, there was no difference in terms of main RV camber size or systolic function (Table I). Even though aPE patients had a higher pulmonary vascular resistance (0.49 ± 0.23 WU) than cPH patients (0.33 ± 0.16 WU, $p < 0.01$); the best discriminatory echo findings between aPE and cPH patients are shown in Figures 1A and B and representative images are shown in Figure 2(A-D).

Conclusion: Based on this data it appears that measures of main RV chamber size and function are not useful in distinguishing aPE from cPH; particularly when severe. In contrast, a significantly reduced RVOT fractional area change and velocity time integral of the RVOT signal are useful in diagnosing aPE, as these findings were seen in all studied aPE patients. A large prospective study is now needed to determine if these variables are related to morbidity and mortality.

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