CORRESPONDENCE

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Authors' reply to Letter to the Editor regarding 'Role of echocardiography in acute pulmonary embolism'

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We would like to thank the authors for their interest in our paper and for thoughtful comments; we are glad that our study has provoked a discussion of the role of echocardiography in diagnosing and predicting outcomes in patients with signs or symptoms of acute pulmonary embolism (APE) [1].

First, we agree with the authors' concern that our results in the present review may differ from the echocardiographic diagnostic rate in the diagnosis of APE in actual clinical practice. In addition, as the authors noted, we calculated the diagnostic value of each echocardiographic variable, usually in patients with massive or submassive APE. To evaluate sensitivity and specificity, we analyzed the diagnostic power from published data with calculable number of participants. After searching all published articles that focused on calculating the diagnostic accuracy of transthoracic echocardiography in PubMed database, 13 studies were selected. As noted by the authors, these published studies had several limitations that led to the inclusion of only a part of the patients with suspected APE. Thus, our study's calculated diagnostic accuracy of echocardiographic signs cannot represent the diagnostic value of the entire patient population presenting with symptoms of APE. It is likely that calculated diagnostic power results in underestimating the sensitivity while overestimating the specificity when applied to a broader and less selected population. However, this should only have a minimal effect on the estimated likelihood ratios, as these biases offset each other [2]. Although the calculated diagnostic accuracy was derived from relatively small and selected populations, we tried to explain the diagnostic power of echocardiography in various clinical scenarios and populations by reanalyzing data from as many studies as possible.

We also agree with the authors' opinion regarding limited echocardiographic examinations in patients with suspected APE over the past years. However, in recent years, echocardiography as a focused cardiac ultrasound has been recommended as the first-line diagnostic method for patients with acute cardiovascular conditions, including APE, in an emergency room [3]. Furthermore, echocardiographic examinations have been increasingly performed along with other diagnostic imaging modalities [4]. As emphasized in the present review, echocardiography is not a definitive diagnostic study for APE; therefore, other confirmatory imaging studies, such as computed tomography pulmonary angiography with contrast enhancement or lung ventilation-perfusion scan, should be performed if a patient has echocardiographic findings suggestive of APE, irrespective of hemodynamic stability.

The authors were concerned about whether echocardiography should be performed in hemodynamically stable patients. Because current guidelines do not recommend echocardiography as part of the diagnostic work-up in non-high-risk patients, as the authors mentioned, our general statement that echocardiography is helpful as a rule in test in the initial diagnosis of APE is not applicable to hemodynamically stable patients. We would like to thank the authors for their concern. This concern should only be answered in several well-designed randomized studies evaluating the efficiency of echocardiography in the initial evaluation. However, the presence of right ventricular (RV) dysfunction is an indication for thrombolytic therapy and a poor prognostic marker in patients with APE. Echocardiography is the most

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commonly used diagnostic tool for assessing RV systolic function, and should be included in the risk assessment of confirmed APE patients. Thus, we inserted this statement "Although echocardiography is not recommended for diagnostic work-up in hemodynamically stable patients with PE, echocardiographic assessment of RV systolic function is now widely recognized as a valuable tool for prognostic assessment of hemodynamically stable patients in current clinical practice. Furthermore, a recently updated prognostic model showed that specific echocardiographic RV dysfunction markers have the potential to improve prognosis beyond existing risk models." in the Conclusion section.

Finally, as the authors mentioned, we agree with the clinical importance of high mortality of APE, which usually occurs in early stages. Early diagnosis and appropriate treatment are important to increase the survival rate of patients with APE. Through this review article, we aimed to bring more attention to APE and improve clinical care by performing echocardiography appropriately in the diagnosis and risk assessment of APE patients. Again, we appreciate your interest in this review article.

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