Usefulness of transthoracic echocardiography for pulmonary artery aneurysm screening in patients with pulmonary arterial hypertension

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Background/Introduction: Pulmonary artery aneurysm (PAA), defined as a pulmonary artery (PA) diameter >40 mm, is a common finding among pulmonary arterial hypertension (PAH) patients. Although often asymptomatic, PAA may lead to life-threatening complications such as left main coronary artery compression or PA dissection. Transthoracic echocardiography (TTE) is regularly employed for risk assessment in PAH patients. However, TTE accuracy for PA measurement has not been evaluated, and current practice guidelines lack formal recommendations for PAA screening and follow-up. We aim to determine whether TTE is an appropriate tool for PA diameter measurement and determine an optimal cut-off point to diagnose a PAA through TTE.

Methods: We retrospectively analyzed a cohort of 657 PAH patients followed up at a national referral centre. For this analysis, we selected those patients who had undergone at least one TTE and one computed tomography (CT) or magnetic resonance (MR) within six months before or after the TTE. We performed an agreement analysis between CT/MR-based and TTE-based PA diameter using the Passing–Bablok method. Furthermore, we calculated the area under the curve for the identification of a PAA with a TTE (compared to CT/MR).

Results: We analyzed 281 simultaneous CT/MR and TTE of a total of 178 PAH patients (71% women). Median age at diagnosis was 42.1 (32.2–58.0) years. PAH etiology was idiopathic or familial in 67 (38%), associated with congenital heart disease in 28 (16%) and associated with connective tissue disease in 36 (20%) patients. In 46 (26%) patients PAH was associated with other entities, such as human immunodeficiency virus, pulmonary veno-occlusive disease, drugs or portal hypertension. We found a significant correlation between PA diameter measured in TTE and CT/CMR (Lin's concordance correlation coefficient = 0.851) (Figure 1). The area under the curve for the detection of PAA was 0.91 (95% CI 0.88–0.95, p=0.018) (Figure 2). We selected a TTE-based PA diameter 37 mm as the optimal cut-off point for PAA identification. This diameter correctly classified 85.4% of measurements with a sensitivity and a specificity of 83.2% and 87.2%, respectively.

Conclusion: Our study demonstrates that TTE is an adequate tool for PA diameter quantification with a strong correlation with CT/MR. This good correlation makes TTE an excellent tool for PAA screening among PAH patients, avoiding unnecessary CT or MR scan and helping to identify those patients in whom close follow-up is advisable. Based on these results, we recommend the inclusion of PA diameter measurement in TTE acquisition protocols for PAH patients.

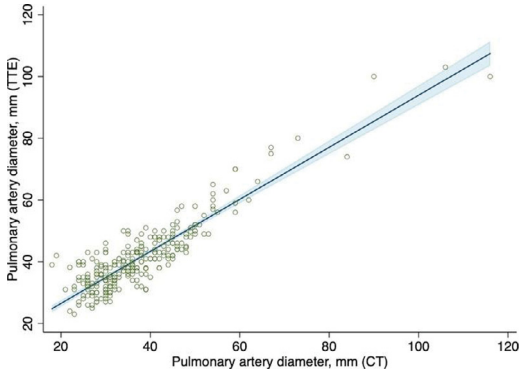

Figure 1. Passing–Bablok regression line

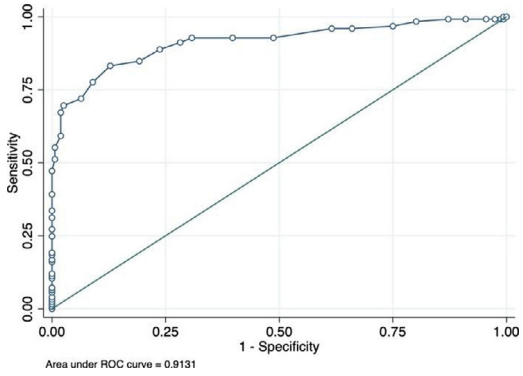

Figure 2. ROC curve for PAA detection with TTE