Comparison of clinical and echocardiographic scores to predict pre-capillary pulmonary hypertension

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Background: Right heart catheterization (RHC) is the gold-standard method to confirm the diagnosis of Pulmonary Hypertension (PH) and to differentiate between pre- and post-capillary PH. However, RHC is an invasive and sometimes low-available procedure, which cannot be performed in all the patients with suspected PH. Clinical and echocardiographic scores have been developed to predict pre-capillary PH. We aimed to compare the performance of four of these scores in a population with suspected PH.

Methods: We retrospectively included consecutive patients who underwent RHC for suspected PH. If the non-invasive evaluation was clearly suggestive of left heart disease, RHC was dispensed being considered not clinically relevant. We also excluded patients with congenital heart disease. We compared the performance of four scores to predict pre-capillary PH: Score 1 (Opotowsky et al.), score 2 (Richter et al.), score 3 (Berthelot et al.) and score 4 (D'Alto et al..

Results: Of the 142 included patients, 76 patients had pre-capillary PH, 42 had post-capillary PH and 24 patients did not meet invasive criteria for PH. We were able to perform the aforementioned scores in the majority of our patients (82% for score 1, 100% for score 2, 98% for score 3 and 83% for score 4). The AUC to predict pre-capillary PH using these scores were 0.74 for score 1, 0.77 for score 2, 0.82 for score 3 and 0.70 for score 4 (p = 0.37). Using the best cut-off points for each score, the score 3 correctly classified the highest percentage of patients (75.5%), with a sensitivity of 92% and a specificity of 60% to predict pre-capillary PH.

Conclusion: Combined clinical and echocardiographic characteristics can be used to predict pre-capillary PH with a fairly good performance. Score 3 (Berthelot et al.) was the score with the highest discrimination power. Validation of these scores in larger cohorts of patients with suspected PH are needed.

	Clinical and echocardiographic characteristics	Interpretation
Opotowsky et al.	LA diameter (<32 mm: +1, >24 mm: -1), mid-systolic notch or acceleration time <80 msec (+1), E/e'>10 (-1)	Score ≥ 0 has a sens. 100% and a spec. 62% for pre-capillary PH
Richter et al.	Age > 68 years (+1), BMI > 30 kg/m2 (+1), absence of RV enlargement (+1), LA enlargement (+1)	Score >4 predicted post-capillary PH (AUC 0.78)
Berthelot et al.	Atrial fibrillation (+2), diabetes mellitus (+1), LA enlargement (15 ≤ LAA < 19: +1, 19 ≤ LAA < 24: +2, ≥ 19 cm2: +3), RV end-diastolic area (<27 cm2: +2), LV mass index (46 < LVMI ≤ 62: +1, 62 < LBMI ≤ 81: +2,< 81 cm2: +3)	Score <5 ruled out post-capillary PH
D'Alto et al	E/e" ≤ 10 (+2), dilated non-collapsible IVC (+2), EI ≥ 1.2 (+1), right-to-left heart chamber dimension ratio > 1 (+1), RV forming the heart apex (+1)	Score ≥ 2 has a sens. 99% and a spec. 54% for pre-capillary PH (AUC 0.85)

Table 1. The clinical and echocardiographic scores evaluated in this study. AUC: area under the curve, EI: eccentricity index, IVC: inferior vena cava, LA: left atrial, LAA: left atrial area, LV: left ventricle, LVMI: left ventricle mass index, PH: pulmonary hypertension, Sens.: sensibility, Spec.: specificity, RV: right ventricle

Abstract Figure.