Exercise-induced pulmonary congestion is a promising marker to diagnose early stage heart failure in patients referred to rule out myocardial ischemia

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Backgrounds: Pulmonary congestion assessed by B-lines using lung ultrasound (LUS) is a hallmark of heart failure (HF). Latent HF at rest can be unmasked during exercise but the diagnosis remains challenging. Exercise-induced B-lines could help diagnose HF with preserved left ventricular ejection fraction (LVEF) at an early stage. The patients in whom coronary artery disease is suspected are also at risk of HF.

Objectives: To assess exercise-induced pulmonary congestion in patients referred to rule out myocardial ischemia.

Methods: Data of stress echocardiography combined with LUS at rest and immediately after exercise in patients with LVEF ≥ 50% referred for investigation of inducible myocardial ischemia in a tertiary center of cardiology, during a 3-years period of time, were retrospectively analyzed. Patients with induced myocardial ischemia, hypertrophic cardiomyopathy or moderate to severe valvular disease were excluded. B-lines were assessed by scanning 2 chest sites. Exercise-induced pulmonary congestion was defined as an increase of B-lines ≥ 2 between baseline and exercise.

Results: A total of 1114 patients were included. Mean age was 63 ± 11 years, 54% of patients had hypertension and 27% diabetes. Exercise-induced pulmonary congestion was identified in 131 (12%) patients. Age, left atrial volume index (LAVi), resting and 20W septal E/e' > 15 and peak tricuspid regurgitation velocity (TRV) were associated with exercise-induced B-lines. In a multivariate logistic regression analysis, LAVi (Odds ratio (OR) = 1.03; 95% confidence interval (CI): 1.01–1.06; p = 0.003) and peak TRV (OR = 3.8; 95% CI: 1.4–10.1; p = 0.009) were independent predictors of exercise-induced pulmonary congestion.

Conclusion: Exercise-induced pulmonary congestion could be diagnosed in patients with preserved LVEF referred to rule out inducible myocardial ischemia. Exercise B-lines are linked with left ventricular diastolic dysfunction indices.