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Cardiopulmonary involvement in pulmonary arterial hypertension: a perfusion and innervation scintigraphic evaluation

Authors:
NR Pugliese1, S Monti2, M Bertasi2, P Marzullo2, A Gimelli2, 1Azienda Ospedaliero-Universitaria Pisana - Pisa - Italy, 2Gabriele Monasterio Foundation-CNR Region Toscana, Cardiology Unit - Pisa - Italy,

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Introduction. In pulmonary arterial hypertension (PAH), right ventricle (RV) adaptation to afterload is characterized by increased end-diastolic volumes and wall thickness. Aim of this study was to clarify cardiac involvement in terms of perfusion and innervation in PAH, using a cadmium-zinc-telluride (CZT) scanner and a cohort of patients with dilated cardiomyopathy (DCM) for comparative purposes.

Methods. Thirteen consecutive patients with newly-diagnosed PAH and 11 DCM underwent quantitative evaluation of myocardial innervation with 123I-metaiodobenzylguanidine (123I-MIBG) and perfusion with 99mTc-tetrofosmin using CZT-SPECT. Regional uptake for both tracers was calculated using a dedicated software (QGS/ QPS; Cedars-Sinai Medical Center, USA).

Results. Mean left ventricle (LV) perfusion was significantly higher in PAH than DCM (75.6±4.2 vs 66.5±2.7, p<0.001), while no difference was observed in LV early and delayed innervation uptake (71.4±12 vs 67.9±6.5 and 73.2±6.4 vs 66.2±4.1). RV perfusion was measurable in all patients. Early RV innervation assessment was feasible in all cases of PAH but only in 7/11 patients (64%) with DCM; delayed RV innervation could not be quantified. RV perfusion and early innervation were significantly higher in PAH compared to DCM (68.4±13.4 vs 28.6±4.1 and 58.8±9.3 vs 27±2.2, respectively; p<0.001). Both in PAH and in DCM, RV perfusion (p=0.0016 and p<0.001) and innervation (p=0.0063 and p<0.001) were significantly lower than those measured in LV.

Conclusion: In PAH, myocardial perfusion and innervation assessment, including RV, is feasible with CZT-SPECT. RV perfusion and innervation were higher in PAH than in DCM, with values invariably lower than those observed in the LV of each patient.