

## **Can Late Gadolinium Enhancement in Pulmonary Hypertension Predict Adverse Clinical Events? A CMR Single Center Study**

**Background** Right ventricular (RV) function predicts prognosis in pulmonary hypertension (PH) patients (pts) and right ventricular (RV) failure. Prior studies evaluating of 3D RV ejection fraction (EF) have yielded inconsistent prognostic information. Here we explore the prognostic value of contrast enhanced Cardiac MRI (CMR) in PH (WHO group 1-5) pts.

**Hypothesis** We hypothesize that CMR-Late Gadolinium Enhancement (LGE), a marker for myocardial fibrosis when present in RV or RV insertion points (RVIP), is a predictor of adverse prognosis in PH pts.

**Methods** A retrospective chart review of PH pts (n=42) who underwent clinically indicated CMR were analyzed. Demographic data: mean age 61 yrs; 26% male; WHO group 1 (55%) group 2 (21%), group 3 (5%) group 4 (14%) group 5 (5%). RV volumetric data were indexed to BSA, and along with RVIP LGE information, were correlated with major adverse clinical events (MACE) including hospitalization, death, referral/need for lung transplantation and addition/increase in inotropic therapy.

**Results** LGE was positive (+) in 18 pts (43%) and negative (-) in the remaining 24 pts (57%). The predominant MACE events occur in the LGE+ group (78%). Specifically, in LGE+ group, 7 pts (39%) had MACE while 11 pts (61%) did not have MACE. In comparison, the LGE- group had only 2 pts (8%) who had MACE and 22 pts (92%) who did not have MACE, <0.03 for all). The results were similar when WHO group 1 were sub analyzed. In WHO 1 subgroup, 11 pts (48%) were LGE+ and 12 pts (52%) were LGE-. In the LGE+ group 4 pts (36%) had MACE while 7 pts (64%) did not. In the LGE- there were no MACE, (<0.04). Fisher's exact test was used for group comparisons. Univariate analysis revealed only RVESVI, RVEF, RVEDVI and MRI LGE predicts MACE. However, via multivariable logistic regression analysis only RVESVI (OR: 1.1, 95%; CI 1.0-1.2) and MRI LGE (OR: 7.0, 95%; CI 1.2-39.5) predict MACE. ( $\chi^2=22.5$ , df=2, n=42, p<0.001).

**Conclusions** Late Gadolinium Enhancement is a seven-fold stronger predictor of MACE than standard CMR metrics. LGE's role as an independent adverse prognosticator may define the pathophysiologic hallmark in PH patients as a direct reflection of underlying RV failure due to progressive myocardial fibrosis.