Abstract: P3559

Renal sympathetic nerve activity, assessed by renal 123-iodine metaiodobenzylguanidine scintigraphy, reflects disease severity in heart failure with reduced ejection fraction

Authors:
Y Yoshitaka¹, H Murai¹, H Tokuhisa¹, M Takamura¹, ¹Kanazawa University Hospital, Cardiology - Kanazawa - Japan,

Topic(s):
Heart Failure with Reduced Ejection Fraction

Citation:
Background: Sympathetic nerve activity is related to cardio-renal syndrome, which plays a crucial role in deterioration in heart failure with reduced ejection fraction (HFrEF). Previous studies reported that renal denervation was effective in HFrEF patients. Recently, we have demonstrated that renal 123-iodine metaiodobenzylguanidine (MIBG) scintigraphy is useful for assessment of renal sympathetic function in hypertension. However, it is unclear whether renal MIBG would reflect disease severity in HFrEF patients.

Methods: Twenty-four HFrEF patients and eleven control without heart failure were included in this study. HFrEF patients were performed MIBG and MSNA and hemodynamics inspection using Swan-Ganz’s catheter (SGC). HFrEF was defined as echocardiography with EF of 50 % or less. MSNA was recorded from the right peroneal nerve to evaluate direct sympathetic nerve activity to the peripheral vascular bed. MSNA was expressed as the number per minute (burst frequency = BF) and the number per 100 heartbeats (burst incidence = BI). Renal MIBG scintigraphy was simultaneously performed with cardiac MIBG scintigraphy. The 20 minutes (early) and 180 minutes (delayed) kidney-to-mediastinum ratio (K/M), early and delayed heart-to-mediastinum ratio (H/M), and washout rate (WR) were measured.

Results: In the HFrEF group, the EF was significantly lower than control group (EF 34.8 ± 9.51 % vs. 63.0 ± 7.43, p < 0.01), and MSNA parameters were significantly increased (burst incidence (BI), 57.7 ± 18.7 vs. 37.0 ± 11.3, p < 0.01; BF 42.7 ± 14.4 vs. 24.1 ± 8.50, p < 0.01). WR of cardiac MIBG was not related to MSNA parameters but negatively related to cardiac output (r = -0.46, p < 0.05) and stroke volume (r = -0.61, p < 0.01) and delayed H/M negatively correlated with mean pulmonary capillary wedge pressure (r = -0.57, P < 0.05). WR of both left and right renal MIBG showed a strong correlation with MSNA (BI; left, r = 0.69, p < 0.01, right 0.60, p < 0.01, BF; left, r = 0.64, p < 0.01, right, r = 0.58, p < 0.01) and no significant correlation between renal MIBG and hemodynamics parameters. HFrEF patients were divided into stage B and stage C based on American College of Cardiology/American Heart Association (ACC/AHA) classification (stage B, n=13; stage C, n=11). There was no significant difference between the two groups in cardiac MIBG parameters. Renal WRs in stage C was increased than stage B (Lt renal WR,51.6 ± 10.6 vs. 40.6 ± 6.53, p < 0.05; Rt renal WR, 43.9 ± 9.97 vs. 35.1 ± 11.3, p < 0.05).

Conclusions: Cardiac WR negatively correlated with cardiac output and renal WR correlated with MSNA. Renal WRs had a significant difference in the heart failure stage of ACC/AHA classification, but cardiac MIBG parameters did not. These results indicate that renal MIBG might be useful to assess renal sympathetic nerve activity in patients with HFrEF and suggesting that renal SNA might be promising therapeutic target in HFrEF.