IMPACT OF DIABETES MELLITUS AND ISCHEMIC CARDIOMYOPATHY ON CARDIAC SYMPATHETIC INNERVATION IN PATIENTS WITH HEART FAILURE

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BACKGROUND-AIM

Impaired sympathetic nervous system activity has been demonstrated in patients with heart failure (HF) and correlated with worse prognosis. Few data are available on the combined effect of diabetes mellitus and coronary artery disease (CAD) on cardiac neuropathy in HF. The aim of this study was to assess the impact of diabetes and ischemic cardiomyopathy on cardiac sympathetic activity in patients with HF.

METHODS

Patients (n=217, age 66±11 years) with HF (New York Heart Association class II-III) and systolic left ventricular (LV) dysfunction (ejection fraction, EF, 32±8%) underwent I-123 meta-iodobenzyl-guanidine (MIBG) scintigraphy. Ischemic cardiomyopathy was defined as ventricular dysfunction in myocardial regions subtended by significant (>70% diameter) coronary artery stenosis at invasive angiography. A 10-minute planar image was acquired from an anterior thoracic view 15 minutes (“early” image) and 3 hours and 50 minutes (“late” image) after I-123-MIBG (111 MBq) administration and early and late heart-to-mediastinum (H/M) ratios were calculated. Washout rate was calculated using the formula: [(early H counts/pixel - early M counts/pixel) - (late H counts/pixel decay-corrected - late M counts/pixel decay-corrected)]/(early H counts/pixel - early M counts/pixel).

RESULTS

Forty-eight (22%) patients (age 62±13 years, LVEF 34±10%) had non-ischemic HF without diabetes, 27 (13%) patients (age 64±10 years, LVEF 32±10%) non-ischemic HF with diabetes, 81 (37%) patients (age 67±10 years, LVEF 32±7%) ischemic HF without diabetes, and 61 (28%) patients (age 68±9 years, LVEF 32±7%) ischemic HF with diabetes. As expected, in overall study population, early and late H/M ratios were inversely correlated with age and directly correlated with LVEF (all P<0.01), while washout rate was inversely correlated with LVEF (P<0.01), but not with age. At Kruskal-Wallis test, in non-ischemic patients without diabetes, early (1.8, range 1.1-2.4) and late (1.7, range 1.1-2.3) median value of H/M ratios were significantly higher as compared to both ischemic patients without diabetes (early 1.7, range 1.1-2.4 and late 1.5, range 1.1-2.3, both p<0.01) and ischemic patients with diabetes (early 1.7, range 1.2-2.2, p<0.05 and late 1.5, range 1.05-2, p<0.005). Conversely, washout rate values were not different among the four groups of patients (p=0.83).

CONCLUSION

The impairment of cardiac sympathetic function in HF is less marked in non-ischemic patients without diabetes than in those with ischemic cardiomyopathy with or without diabetes. These results suggest that both diabetes and coronary artery disease have a detrimental effect on cardiac neuropathy in HF patients.