Endothelial microparticles can predict the improvement of ischemic heart failure

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Background/Aims: Endothelial microparticles (EMP) are small vesicles shed from activated or apoptotic endothelial cell. We wonder elevated EMP and EPC level is possible to predict the improvement of ischemic heart failure **Methods:** Total 354 patients (age 63±11, male 255(72%)) who diagnosed as ischemic heart failure (EF<45%, three vessel disease) were divided as two group. Group 1 showed improved ejection fraction (mean Δ6.3±1.1%) after optimal medical therapy. Group II did not show improvement of ejection fraction (Δ0.3±0.4%). Mean follow duration was 6.2±2.1 months. EMP and endothelial progenitor cells(EPC) are determined in peripheral blood by anti CD31-PE and anti CD42-FITC. Microparticles(MP) were defined as CD31+/CD42- particles with a diameter <1.5μm, being MP size calibrated with flow cytometry size calibrations. The values of EMP, EPC, and EMP/EPC ratio in patients with ischemic heart failure were compared with control group. **Results:** Group I (n=185, mean age 64±11) and Group II (n=169, mean age 62±10) did not show differences in terms of medication. There were no significant differences in coronary risk factors such as age, DM, HBP, dyslipidemia, smoking between groups. The level of EMP(%) was lower in Group I than Group II [(1.33 ± 0.71) in group I, (1.54 ± 0.96) in Group II, p=0.03]. But EPC values were similar between two groups. [(0.042 ± 0.016) vs (0.049 ± 0.022, p=0.11)] and EMP/EPC ratio were significantly different [(49.4 ± 14.3) in Group 1 vs (62.1 ± 22.2) in Group II, p=0.02]. EMP/EPC ratio had significant predictive value to detect the improvement of ischemic heart failure. (OR, 1.88. 1.32-1.99, p=0.01) **Conclusions:** Improvement of ischemic heart failure after optimal medical therapy might be predicted by measuring the circulating endothelial microparticle and progenitor cell ratio.

	Group I (n=185)	Group II (n=169)	P value
Age	61.2±10.7	60.1±12.4	0.41
Male(%)	129(69.7)	126(74.5)	0.06
DM(%)	54(29.5)	43((26.3)	0.88
HTN(%)	93(50.5)	99(59.5)	0.07
Smoking(%)	3(15)	35(21)	0.12
Statin (%)	155(84.2)	143(85.9)	0.66
T cholesterol(mg/dl)	176.6±40.9	158.4±40.7	0.44
LDL(mg/dl)	134.6±33.2	96.4±34.3	0.98
HDL(mg/dl)	42.1±10.2	43.7±14.6	0.55
Creatinine(mg/dl)	1.1±1.4	1.0±1.2	0.40
HbA1c(%)	5.8±0.7	6.2±1.2	0.31
EMP(%)	1.33±0.71	1.54±0.96	0.03*
EPC(%)	0.042±0.016	0.049±0.022	0.11
EMP/EPC ratio	49.4±14.3	62.1±22.2	0.02*

Heart rate reduction with ivabradine in nonischemic heart failure

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Background/Aims: The recovery of left ventricular function (RLVF) in heart failure with reduced ejection fraction (HFrEF) can be accomplished by guideline-directed medical therapy (GDMT). Heart rate (HR) reduction is known to be related to improved clinical outcomes in HFrEF. Therefore, we investigated the relationship between HR reduction and RLVF in patients (pts) with nonischemic HFrEF. **Methods:** We retrospectively analyzed the echocardiographic data of 180 pts of nonischemic HFrEF (age: 57 ± 16 years old, 63.8% male, left ventricular ejection fraction (LVEF): 28 ± 10%, LV end diastolic dimension: 64 ± 8 mm) in a single center from Jan 2012 to Dec 2017. The RLVF was defined as improvement in LVEF ≥10 % during follow-up period (median 403 days). We reviewed electrocardiography at 3, 6, 9 and 12month after GDMT, with defined effective HR reduction as HR <75/min at every visit. **Results:** We found 112 (62.2%) pts of RLVF, 126 (70%) pts with normal sinus rhythm (NSR) and 32 (17.8%) pts on ivabradine treatment. Among pts with NSR (n=126), there were 72 pts (57.1 %) of RLVF and 47 pts (37.3%) of effective HR reduction. In effective HR reduction group, ivabradine (n=10) showed higher incidence of RLVF compared to no-ivabradine group (n=37, 90% vs. 54%, p=0.038). In ivabradine treatment (n=32), effective HR reduction group (n=10) had higher incidence of RLVF than no-effective HR reduction group (n=22) (90% vs. 50%, p=0.03). In addition, in RLVF with NSR (n=72), the incidence of early RLVF (<1 year) was higher in effective HR reduction group than no-effective HR reduction group (83% vs. 61%, p=0.044). **Conclusions:** Effective HR reduction with NSR (<75/min at every visit), especially on ivabradine treatment was related to more and early RLVF in nonischemic HFrEF pts.

Table 1. Ivabradine use and LVRR with HR<75/min

	Ivabradine use		SUM
	No	Yes	
Recovery<10%(non-LVRR)	n=17(46%)	n=1(10%)	n=18
Recovery≥10%(LVRR)	n=20(54%)	n=9(90%)	n=29
SUM	n=37	n=10	n=47

Table 2. Heart rate and LVRR in ivabradine group

	HR<75	HR≥75	SUM
Recovery<10%(non-LVRR)	n=1(10%)	n=11(50%)	n=12
Recovery≥10%(LVRR)	n=9(90%)	n=11(50%)	n=20
SUM	n=10	n=22	n=32