Abstract: **P4529**

**Atrioventricular optimization in cardiac resynchronization therapy with quadripolar leads, improves energy handling and quality of life in heart failure patients: HUMVEE Trial**

**Authors:**
CK Antoniou¹, K Konstantinou¹, C Chrysohoou¹, P Dilaveris¹, N Magkas¹, J Skiadas¹, V Antonakos¹, K Kakioris¹, K Gatzoulis¹, DIMITRIS Tousoulis¹, ¹1rst Cardiology Clinic University of Athens - Athens - Greece,

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Background. Cardiac resynchronization therapy (CRT) is a well-established technique for symptomatic heart failure (HF) patients, producing significant clinical benefits. Recent studies have revealed the potential role of multipoint pacing (MPP) in improving response and clinical outcomes. The aim of Heart failUre study of Multisite pacing effects on VEntriculoartErial coupling (HUMVEE) trial was to evaluate the association between MPP of the left ventricle vs those of standard biventricular pacing (BVP) on: a) ventriculoarterial coupling (VAC) and energy efficiency of the failing heart, b) diastolic function, c) quality of life, and d) NT-proBNP levels. Methods. HUMVEE is a single-center, prospective (13 months) trial (clinicaltrials.gov identifier NCT03189368), of 54 NYHA III patients (69± 9 years; 79% men; 50% dilated cardiomyopathy), under optimal tolerated medical therapy, with standard BVP indication, having being implanted with a CRT system able to deliver both modes of pacing. Creatinine and NT-proBNP levels and echocardiographic measurements (VAC calculation, strain rate, diastolic function assessment), as well as 6-min-walking-test and quality of life (MLHF questionnaire) were measured at baseline, 6 months post BVP optimization (right before MPP activation) and at the end of follow-up (6 months post MPP optimization). Cardiac power (CP) was calculated according the equation: CP=Cardiac Output x Mean Aortic Pressure/451. Results: Both CRT and MPP improved 6-min-walk (differences at baseline/6 mo/end of FU: 277±27 vs. 345±27 vs 363±27 m, p=0.07); left ventricular ejection fraction (24,2% vs 30,6%vs, 32%, p=0.05); end -diastolic diameters of left ventricle (65±1,4 vs. 63±1.7 vs.61±1.1, p=0.03); end-systolic volume (150±15 vs. 140±10 vs. 131±13, p=0.08); stroke volume (41.6±9 vs. 53.6 ±14 vs. 62±9, p=0.0001 for MPP); left atrial volume (76±5 vs. 74±10 vs 61±6, p=0.001 for MPP), E/Emv (14±5vs.12±4 vs.11±3, p=0.05 for MPP); NtproBNP (2782±1000 vs.2080±2500 vs.2000±1000, p=0.05 for MPP). VAC was reduced from 1.14±0.27 to 1.1±0.17 (p=0.1) while CP increased from 564.2 ±142 to 768±103 (p=0.009). Quality of life score (the lower the better) improved from 23.75±17 at baseline to 17.25±10 at end of FU (p=0.05). Conclusions. MPP is a new, promising pacing modality with the potential to improve HF patients’ outcome, offering additive effects on myocardial energy balance, cardiac power, systolic and diastolic ventricular function and aortoventricular coupling, especially in ischemic patients. HUMVEE trial illustrates those clinical, imaging and biochemical divergences of MPP from standard BVP that reflect significant improvement in quality of life in patients with advanced HF and cardiac dysynchronizaton.