Time-course of plasma NT-proCNP-type natriuretic peptide in end-stage heart failure patients supported by left ventricular assist device implant

M. Cabiati[1], C. Caselli[2], R. Caruso[3], J. Campolo[3], S. Turchi[2], O. Parodi[3], D. Giannessi[2], S. Del Ry[2]

1Scuola Superiore Sant'Anna - Pisa - Italy, 2Siena University - Pisa - Italy, 3CNR Institute of Clinical Physiology - Milano - Italy

Purpose: Atrial natriuretic peptide (ANP) and B-type natriuretic peptide (BNP) as well as the respective amino-terminal NT-proANP and NT-proBNP have now been well established as predictors of outcome in patients with heart failure (HF). C-type natriuretic peptide (CNP) and NT-proCNP are increased in HF patients as a function of disease severity, supporting a role for these peptides in the pathophysiology of HF, but their modifications during left ventricular assist device (LVAD) implant are lacking. Aim of this study was to evaluate the time-course of natriuretic peptides in end-stage HF patients undergoing LVAD implant in order to recognize new reliable predictive biomakers of cardiac recovery during LVAD.

Methods: Five end-stage HF patients (NYHA class III and IV; age: 57±11 yrs; LVEF%<20) undergoing LVAD implantation were studied. Clinical hemodynamic evaluation and blood samples were obtained at admission (T1) and at 4, 24, 72 hrs and 1, 2, 4 weeks (T2-T7) after LVAD implant. NT-proANP and NT-proCNP were measured in plasma EDTA and aprotinin samples by a direct ELISA () while NT-proBNP by the Elecsys® 2010 analyzer.

Results: The NT-proCNP time-course during LVAD was the following: T1=88.8±12.8 pg/ml; T2=144±29.8; T3=241.6±86.8 ($p<0.05$ vs T1); T4=229.7±66.4; T5=162.3±66.5; T6=175.3±47.7; T7=76.9±8 (p=ns vs T1). NT-proANP showed a similar pathway while NT-proBNP is reduced after LVAD implant (T1=4.1±2.2 ng/ml; T3=3.0±0.4), remaining lower than at baseline until 4 weeks (T7=3.1±0.9 ng/ml). NT-proCNP positively correlated with NT-proANP ($p=0.03$) while no correlation was found with NT-proBNP.

Conclusions: This study reports for the first time original data on NT-proCNP levels after LVAD as a function of the time. The natriuretic peptides are differently modulated by LVAD, although all peptides resulted reduced after 4 weeks from implantation. The parallel determination of these effectors could allow us to obtain an integrated description of pathophysiological changes occurring during mechanical support.