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Effects of chronic heart failure unconventional therapies on endothelial function

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Funding Acknowledgement: None

Introduction: Endothelial Dysfunction (ED) of peripheral arteries in Chronic Heart Failure (CHF) subjects has been demonstrated.

Purpose: We assessed endothelial function in subjects undergoing unconventional treatments for CHF, namely Heart Transplantation (HTX), continuous-flow Left Ventricular Assist Device implantation (LVAD), and repeated levosimendan infusions (r-LEVO).

Methods: Twenty HTX recipients (median time from HTX 21 months), 20 patients supported with LVAD (median time from implant 39 months), and 20 patients receiving monthly Levosimendan infusions (median time on treatment 28 months) were enrolled and compared to a group of 20 healthy subjects. ED was evaluated with ultrasound assessment of the diameter before and after ischemic stress at the brachial artery level. The difference between the two diameters normalized for the baseline value (Flow Mediated Dilation – FMD) has been used for the analysis. All the patients were stable at the time of FMD assessment, with those on r-LEVO being evaluated prior to infusion.

Results: FMD was significantly lower in HTX and LVAD groups with respect to controls (9.8±7.4, 9.3±5.7, and 15.6±6.4% respectively, p=0.01), but not in r-LEVO group (12.5±6.9%).

When patients were analyzed according to time from the operation or on treatment, (< versus > of the median value), no differences were seen in HTX and r-LEVO group, while in LVAD group FMD was borderline significantly higher in patients with longer follow-up (8.4±6.4% versus 10.2±5.2%, p=0.05).

Conclusions: Based on this preliminary data we can infer the following: 1- FMD is abnormal in HTX recipients, despite their good functional status, probably due to factors unrelated to CHF (e.g. hypertension, renal insufficiency, denervation, and drug effects); 2- LVAD patients also show ED, with possible better adaptation in very long-term survivors; 3- Near-normal FMD values in CHF patients who remain stable with r-LEVO suggest that pulsed treatment may obtain favorable effects at peripheral level, persisting after clearance of the drug and its metabolites.