Examination of pituitary adenylate cyclase-activating polypeptide (PACAP) in patients with atrial fibrillation undergoing pulmonary vein isolation

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Introduction: Pituitary adenylate cyclase-activating polypeptide (PACAP) is a cardioprotective neuropeptide. It has previously been shown that plazma PACAP level increases in myocardial infarction and decompensated heart failure, whereas it decreases in chronic heart failure.

Patient material and method: We examined blood samples from patients (n=46) undergoing pulmonary vein isolation for atrial fibrillation. We collected 5 ml blood samples from the femoral vein at the beginning, from the right atrium before the septal puncture, from the left atrium before and after the ablation, from the femoral vein at the end of the procedure and the next day from the cubital vein. PACAP levels were determined by ELISA. Patients were divided into intact (n=29) and scarred (n=17) left atrial groups by electroanatomical map. PACAP levels were compared in the total population and in the two groups and correlated with left atrial size and different comorbidity data.

Results: Significantly higher levels of PACAP were detected in atrial blood and in post-operative femoral vein samples compared to peripheral blood collected at the beginning and 1 day after the procedure. We measured decreased PACAP levels in the left atrium after ablation compared to samples from left atrium before the ablation. Although we found lower PACAP levels in the left atrium after ablation in patients with scarred atrium compared to the intact group, the PACAP levels showed significant elevation in the femoral vein after the ablation in patients with intact atria.

Conclusions: Our study was the first to show a difference between PACAP levels in atrial and peripheral blood samples. The elevated PACAP levels measured in atrial samples may be due to myocytes and neurons, whose PACAP production decreases depending on the degree of scarring following ablation-induced injury in the left atrium. Transient systemic elevation of PACAP levels is demonstrated in the periphery, suggesting a potential biomarker role for PACAP in these pathologies.