Abstract: P1580

Left atrial volume index predicts improvement in renal function after catheter ablation of atrial fibrillation

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Topic(s):
Renal Failure and Cardiovascular Disease

Citation:
Background: Atrial fibrillation (AF) increased the risk of development of kidney disease. The elimination of AF by catheter ablation is associated with improvement in renal function. However, the mechanism of cardio-renal interaction in AF has not been fully elucidated.

Purpose: We tested the hypothesis that left atrial volume index (LAVI), which is a marker of left atrial mechanical reserve, predicts improvement in renal function after restoring sinus rhythm with catheter ablation of AF.

Methods: We analyzed consecutive patients who underwent catheter ablation of AF from January 2012 to October 2018 and had completed follow-up more than 3 months after catheter ablation. Exclusion criteria were need for hemodialysis and acute hospitalization. Estimated glomerular filtration rate (eGFR) was assessed on admission and at the end of follow-up periods after catheter ablation and the difference was defined as ΔeGFR. Left atrial volume index was derived using the biplane area-length method.

Results: A total of 159 AF patients (paroxysmal 112 [70%], persistent 47 [30%]) were included in this study. The mean age was 65±11 years and 74% were male. During the mean follow-up period of 7.9±3.2 months, 105 patients (66%) were free from atrial tachyarrhythmias and 54 (34%) experienced the recurrence. Baseline eGFR and LAVI were not significantly different between the non-recurrence group and the recurrence group (71.0±17.4 and 75.1±22.8 mL/min/1.73m²; p=0.24, 35.7±12.5 and 37.9±15.0 ml/m²; p=0.34). ΔeGFR in the non-recurrence group was significantly greater compared with the recurrence group (+1.5±1.0 versus -4.3±1.4 mL/min/1.73m²; p=0.001). Baseline LAVI was negatively correlated with ΔeGFR in the non-recurrence group (r=-0.3; p=0.002; Figure), but not in the recurrence group (p=0.1). Multiple regression analysis in the non-recurrence group identified baseline LAVI (β=−0.35, p<0.001), baseline age (β=−0.31, p<0.001) and baseline eGFR (β=−0.59, p<0.001) as independent predictors for eGFR improvement after catheter ablation. In the patients with LAVI <34 ml/m², age <70 years and eGFR <90 mL/min/1.73m², the mean ΔeGFR was +6.3±1.9 mL/min/1.73m².

Conclusions: LAVI, a marker of left atrial mechanical reserve, was an independent predictor of improvement in renal function after restoring sinus rhythm with catheter ablation of AF. This observation suggests that AF-related deterioration of renal function is due at least in part to impaired atrial mechanical function.
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