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Abstract

Contributions in Diagnosis and Management of Atrial Fibrillation.

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Introduction

This paper aims to study the mechanisms underlying the emergence and progression Afib and the modern therapeutic methods. The role of atrial remodeling in generating atrial fibrillation is studied by modern three-dimensional imaging techniques such as computerized 3D echocardiography and multislice CT angiography 64. We also tried to influence this process by modern therapeutic methods: Pulmonary vein isolation by radiofrequency current.

Material and methods

The study was conducted in the Cardiology Clinic of Mures County Clinical Emergency Hospital. Patient enrollment was between 1 January 2009-31 January 2011. Follow-up was continued until 30 June 2011. A total of 357 patients were enrolled.

We also enrolled patients hospitalized for other cardiovascular disease who had symptoms attributable to atrial fibrillation.

Exclusion criteria were: paroxysmal atrial fibrillation episodes occurred during reperfusion syndromes in patients with acute myocardial infarction, or atrial fibrillation with low ventricular rate requiring permanent pacing.

In all patients was tempted to obtain adequate heart rate control. In patients with persistent atrial fibrillation conversion to sinus rhythm was tempted. In patients with long standing-persistent atrial fibrillation cardioversion decision was made based on symptoms, left atrial size and patient preference. A subset of patients was selected in wich left atrial remodeling was monitored by 3 dimensional imaging methods (3D echocardiography or computed reconstruction by multislice angioCT). One of the aims of this thesis was to introduce in clinical practice the pulmonary veins isolation by RF current using CARTO XP Navigation System as a modern method of treatment of atrial fibrillation. Within this research were performed 18 ablation procedures of pulmonary veins.

Results

354 patients, 199 men and 155 women with atrial fibrillation admitted to the cardiology clinic were followed. The mean age was 66 ± 8 years.

Evaluation of associated diseases shows the presence in a higher percentage of left ventricular dysfunction in patients with prolonged arrhythmia duration over one year ($p = 0.001$), but no correlation between the presence of left ventricular dysfunction and left atrial size was noted. There was a statistically significant increase in left atrial size with duration of arrhythmia ($p < 0.001$) in the absence of significant LV dilatation.

There was a significant difference in left ventricular performance between patients with paroxysmal atrial fibrillation and patients with persistent or permanent atrial fibrillation ($p = 0.002$).

In 3D echocardiography analysis observed that patients with recurrence of arrhythmia had larger left atrium associated with lower kinetics compared to patients who maintained sinus rhythm ($p \leq 0.001$), without a significant difference in the ventricular performance ($p = 0.36$).

Analysis of left atrial volume shows an inflection point over 100ml above which a sharp increase in the rate of AF recurrence can be observed.

Objective parameters for assessing the remodeling process in the left atrium as: atrial-volume left-diameter of the AS-amplitude atrial contraction were identified.

After ablation of pulmonary veins the patients showed no recurrence of arrhythmia at of 3.6 and 12 months follow-up.

The echocardiographic follow-up showed a decrease in left atrial size at 6 months post ablation, without registering differences in left ventricular size or performance.

Conclusions

Left ventricular dysfunction is a risk factor for the initiation and maintenance of atrial fibrillation, meanwhile the arrhythmia is decreasing the ventricular performance even under a controlled ventricular rate.

Anteroposterior diameter of the left atrium is a predictor of atrial fibrillation recurrence in patients with paroxysmic arrhythmia, but is useless in those with extensive atrial remodeling. Atrial remodeling in persistent atrial fibrillation decreases the cardioversion efficiency of antiarrhythmics in parallel with the duration of arrhythmia; electrical conversion being required.

Long duration of arrhythmia is with extensive atrial remodeling and increase the risk of recurrence postcardioversion.

Contractile remodeling takes place in parallel with structural remodeling, mechanical function of the left atrium showing a negative correlation with its size determined by three-dimensional echocardiography.

The volume and the left atrial contraction amplitude reflect the process of remodeling in atrial fibrillation.

Atrial fibrillation ablation improves quality of life.

The reverse remodeling process of the left atrium after pulmonary veins postablation is important, and may be associated with a lower risk of long-term blood clotting by reducing atrial size.

Keywords: atrial fibrillation, 3D echocardiography, pulmonary vein ablation.