EHRA–JHRS Joint Symposium

Catheter Ablation of Persistent Atrial Fibrillation: What's the Challenge?

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EHJ-1 -

The Substrate of Persistent Atrial Fibrillation; Anything New?

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It is well known that the structural and electrophysiological changes, which are called structural and electrical remodeling, respectively, occur in the atria with the development of atrial fibrillation (AF). These changes are characterized by an asymmetrical ballooning of the atrial chamber morphologically, but the atrial ballooning process and the histological changes of the atria have not been clearly elucidated.

Macroscopic and histological changes of left atrium (LA) in the patients with AF, which could be structural atrial remodeling, are characterized by as follows by using autopsied heart.

1) asymmetrical ballooning of LA chamber, especially on the left side,

- 2) thinning of posteroinferior wall of LA. (LAPW)
- 3) decrease in muscle thickness in LAPW
- 3) LA muscle discontinuity,
- 4) Interstitial fibrosis,
- 5) focal myocardial atrophy and hypertrophy,
- 6) disturbed muscle layer structure

EHJ-2 -

Treatment Strategies for Persistent AF : Pulmonary vein isolation and linear lesions and…?

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Background : The sequential stepwise catheter ablation, involving pulmonary vein (PV) isolation, the electrogram–based ablation and the linear ablation, has been demonstrated as the effective treatment to restore and maintain sinus rhythm in patients with persistent atrial fibrillation (AF). However it is not well investigated whether linear ablation or electrogram–based ablation would be better to perform first. **Methods** : A total of 40 consecutive persistent AF patients (age : 54 ± 10 years, 39 males) who underwent catheter ablation were enrolled in this study. The linear ablation of both the roof line and the mitral isthmus were performed following PV isolation during AF. The high–density automated complex frac7) Intact mitral vestibule area

Among these findings, fibrosis is considered to play some important role electrophysiologically in persistency of AF, such as electrical conduction disturbances. Marked fibrosis was recognized in the posterior wall of LA, especially in LAPW.

We estimated atrial fibrosis quantitatively in the patients with and without persistent AF by using autopsied hearts. The level of fibrosis in LAPW in patients with AF was extremely high compared to that in normal subjects without AF (23.0 + / - 9.7% vs. 4.0 + / -2.9%). However, there were no differences in the level of fibrosis between AF patients and normal subjects (5.3 + / -1.5% vs. 5.0 + / -1.3%) in the area of the mitral vestibule (the area just above mitral annulus).

Recently, Platonov et. al reported that fibro-fatty replacement of atrial myocardium could be seen extensively in patients with persistent AF compared to those in sinus rhythm and highlighted the importance of inflammation.

In this session, I will reconsider the anatomical changes of substrate which is a background of AF, and the meaning of remodeling and reverse remodeling.

tionated atrial electrogram (CFAE) mapping was performed using the NAVX, and maps were obtained three times during the procedure (prior to ablation, after PV isolation and after linear ablations) and were compared.

Results : Persistent AF was terminated by ablation in 13 of 40 patients. The mean total LA surface area and baseline CFAEs area were 120.8 ± 23.6 and 88.0 ± 23.5 cm² (74.2 %), respectively. After PV isolation and linear ablations in the LA, the area of CFAEs area was reduced to 71.6 ± 22.6 cm² (58.7%) (P<0.001) and 44.9 ± 23.0 cm² (39.2 %) (P<0.001), respectively. The sinus rhythm was maintained in 80.0 % (32/40) of patients with or without anti–arrhythmic medical treatment following the single ablation procedure.

Conclusion: Both PV isolation and LA linear ablations clearly diminished the CFAEs in PsAF patients and terminated persistent AF in one third of patients. The linear ablation appears to be favorable to be performed prior to the electrogram–based ablation. РМ