Metabolic Syndrome and Catheter Ablation in Atrial Fibrillation

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Atrial fibrillation (AF) is the most common arrhythmia in clinical practice and is associated with increased risk for mortality and stroke. The prevalence of AF is high and drastically increases with age. Therefore, a downstream therapeutic approach using antiarrhythmic drugs (AADs) is insufficient, and considerable attention has been devoted to clarifying the potential role of an approach which focuses on the development and recurrence of AF. In this issue of the Journal, Tang et al. report that a diagnosis of metabolic syndrome (MetS) prior to catheter ablation is associated with a high rate of recurrence of AF after the ablation! This is an important observation, because catheter ablation is widely used as a therapeutic option for restoring and maintaining sinus rhythm in patients with drug-refractory AF, and MetS is considered as a risk factor for newly developed AF.

Catheter Ablation

Recent multicenter studies demonstrated no difference in mortality between AF patients who were treated by rhythm-control drugs and those taking rate-control drugs; but in terms of quality of life, rhythm control is preferable for patients with symptomatic paroxysmal AF. Because the efficacy of AADs is limited, catheter ablation has been used for rhythm-control therapy in the patients with drug-refractory AF and favorable results have been reported. For catheter ablation of lone paroxysmal AF, circumferential electrical isolation of the 4 pulmonary veins (PV) is effective because the triggered firing and arrhythmogenic substrate of the AF is usually located in and/or around the ostium of the PVs. On the other hand, additional ablation in the atria is required in patients with persistent AF, because structural remodeling in the left atrium (LA) plays an important role when AF is persistent.

Obesity is a key component in the development of MetS, and an effect of the body mass index on the outcome of catheter ablation of AF has been reported. Although the LA enlargement that is usually present in obese patients seems to work as a facilitating factor in AF recurrence, Cha et al. found that AF catheter ablation was similarly effective in obese patients, which was in good accordance with the study of Tang et al. In the latter study, AF recurrence mostly occurred early after catheter ablation, and an electrical reconnection between the LA and PV was confirmed in most patients who underwent repeat catheter ablation. Because AF recurrence did not different between the groups with simple PV isolation or PV isolation plus substrate modification, the primary reason for AF recurrence was thought to be electrical reconnection, and the development of triggered firing from a new, non-PV focus, and/or progression of structural and electrical remodeling, seemed to play a less important role! MetS may facilitate the electrical reconnection through mechanisms that remain to be identified.

MetS

Several risk factors (advanced age, hypertension, congestive heart failure, diabetes mellitus, obesity etc) are reported to be associated with new AF occurrence, and some of them are included in the diagnostic components of MetS. Watanabe et al. analyzed the data from an annual health check-up program in a local community and showed a higher incidence of newly developed AF in those with MetS. MetS is characterized by many of the same risk factors of atherosclerosis, and these may be related to chronic inflammation. Some studies have related an increase in C-reactive protein (CRP) (and IL-6) in paroxysmal and persistent AF. Furthermore, inflammatory infiltrate, myocyte necrosis, and fibrosis were reportedly found in atrial biopsies from patients with lone AF. Chronic inflammation of the heart can facilitate electrical and structural atrial changes, resulting in both the initiation and maintenance of AF.

For the treatment of patients with hypertension, an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) is more effective for reducing the incidence of newly developed AF than treatment with a calcium-channel blocker or β-blocker, probably because inhibition of the renin–angiotensin system, and consequently of angiotensin II, has a preventive effect on cardiac remodeling. ACEI and ARB also counteract the inflammatory process and oxidative stress, which is favorable for preventing an occurrence of AF. Although there was no difference in the use of ACEI or ARB between the patients with and without AF recurrence in the study by Tang et al. additional analysis of serum CRP (and/or IL-6) might provide important information of the role of inflammation in AF recurrence.

This study by Tang et al. emphasizes the importance of diagnosing and treating MetS, and draws physicians’ attention to the relationship between it and AF recurrence after catheter ablation.

References


