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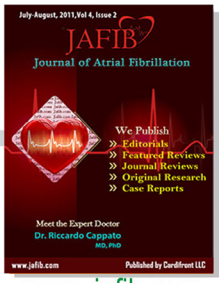

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Irrigated-Tip Magnetic Catheter Ablation Of AF: ALong-Term Prospective Study In 130 Patients

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Original Paper Reviewed
Pappone C, Vicedomini G, Frigoli E, Giannelli L, Ciaccio C, Baldi M, Zuffada F, Saviano M, Pappone A, Crisa S, Petretta A, Santinelli V. Irrigated-tip magnetic catheter ablation of AF: a long-term prospective study in 130 patients. Heart Rhythm 2011;8:8-15.

Introduction

The interesting paper by Pappone et al.[1] summarizes a single center experience using remote controlled (RC) magnetic catheter ablation of atrial fibrillation (AF). The magnetic navigation system (MNS, Stereotaxis, USA) represents a well-established catheter navigation and ablation platform, which has proven feasibility and safety in the treatment of various arrhythmias.[2 3 4 5 6] The soft magnetic catheter aligns in parallel to an externally induced magnetic field, which is steered by two permanentmagnets positioned next to the patient¥s table.

In conjunction with a special software (Navigant, Stereotaxis, USA) and catheter advancing system (Cardiodrive, Stereotaxis, USA), RC catheter navigation and ablation can be performed. MNS guided catheter ablation of focal substrates is associated with established manual ablation success rates but reduced fluoroscopy exposure or both the patient and physician.

However, the situation in AF ablation requiring long contiguous linear ablation lesions encircling the PVs after 3-dimensonal electroanatomic (3D EA) LA reconstruction has remained controversial. Initial experience using a solid tip magnetic catheter reported feasibility and safety using this setting in AF ablation7 however di Biase et al.[8] observed a low rate of acute PV isolation associated with high AF recurrence and substantial catheter tip charring. Until recently, these shortcomings have in part been attributed to the lack of an open irrigated tip magnetic catheter. Therefore, the launch of the open irrigated tip magnetic catheter has long been awaited.

Pappone et al1 now reported their long-term experience in a large patient cohort using two generations of the magnetic open irrigated tip ablation catheter. After RC 3D EA LA map reconstruction (CARTO RMT, Biosense Webster) all PVs have been encircled. Importantly, the procedural endpoint was not real-time Lasso guided PV isolation but rather Lasso controlled PV conduction following PV ablation. Additional linear lesions sets such as mitral, roof, and posterior lines as well as cavotricuspid isthmus (CTI) ablation have been performed in all patients. After a mean follow up time of 14.5 months the success rate was 81.4% and 67.3% in paroxysmal and persistent AF patients, respectively. The reported success rates tend to be lower than the group's manual ablation results and might therefore reflect a learning curve.[9 10] Interestingly, despite of a complex ablation line design, total procedure time was short (94.6 ± 15.3 min). RC LA mapping (26.5 ± 9.8min), septal PV ablation (10.8 ± 3.5min),

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lateral PV ablation (14.9 ± 3.7min) and mitral isthmus ablation (14.1 ± 3.2 min) did account for a total of 66.3 min procedure time. Ablation along the septal PVs was shorter than ablation along the lateral PVs.

However, as the authors stated bidirectional conduction block was not routinely assessed, explaining reported short procedure times. These findings are inconsistent with recent data published from different groups.[11 12] It has been described that RC MNS Lasso guided PVI is feasible but specifically septal PVI is time consuming due to anatomic reasons and the design of the magnetic catheter. The single transseptal LA access and Lasso mapping following PV ablation may have facilitated catheter navigation contributing to shorter procedure times.

Power settings used in this reported patient group remain unclear. Within the method section it has been stated that power was limited to 20W while ablating the posterior LA wall, but according to table 2 (page 10) 30W have been deployed. Obtaining transmural contiguous linear lesions with 30W compared to 20W may be easier, which may in part explain the reported high rates of acute PVI (RSPV: 95%, RIPV: 92%, LSPV: 100%, LIPV: 100%). Notably,the first-generation open irrigated magnetic catheter was never commercially introduced due to substantial tip charring and embolic complications.

A second-generation catheter with re-designed irrigation ports was developed and subsequently launched. It would have been very interesting to specify which of these 130 patients had been treated with either the first- or second-generation catheters. The important observation of no tip charring was explained with restricted ablation time (10-15 s) guided by impedance drop, however additional ablation up to 30s, if needed was allowed.

Interestingly, no late AF recurrence was observed in a total of 99 patients at risk after 12 and 15 months of follow up in persistent AF and paroxysmal AF, respectively. If this is observation was related to the use of MNS technology, or may change when longer follow up data is available, remains to be elucidated. The occurrence of left AT after RC MNS ablation was 6%. The tachycardia mechanism was related to macro-reentry circuits involving either the LA roof or the left isthmus.

Importantly, it was discussed that not checking for bidirectional block at linear lesions during the index procedure could have been pro-arrhythmic. Therefore, standard EP criteria proving conduction block along all deployed linear lesions should always be applied also if the MNS exerting lower tip to tissue contact forces is used. Low catheter tip contact forces in turn are clearly beneficial with regards to the minimized risk of mechanical cardiac perforation using the soft magnetic catheter compared to ablation strategies exerting greater contact forces.[13]

Conclusion

Irrigated tip MNS guided catheter ablation of AF is associated with acceptable long-term success rates. However, a prospective multi-center trial from highly experienced centers is clearly needed to fully answer the open questions regarding the true value of remote controlled magnetic navigation in AF ablation..

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