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**Asymptomatic recurrence after AF ablation: is all lost?**  
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## Asymptomatic recurrence after AF ablation: Is all lost?



As the functionality and usage of permanent pacemakers and cardiac defibrillators continues to grow, these devices also provide an opportunistic means of cardiac arrhythmia detection. Ongoing refinements in device detection algorithms have facilitated the diagnosis of atrial fibrillation (AF) with a high degree of accuracy [1]. Not only is this beneficial in corroborating symptomatic events, but there is a potential for an evolving role in guiding anticoagulation in these patients. Subclinical AF is common in patients with pacemakers and is associated with increased stroke risk [2,3]. However, the duration of subclinical AF at which patients may benefit from anticoagulation is still a matter of debate [4].

In this issue of the *Indian Pacing and Electrophysiology Journal*, Osaka Y et al. report on the prevalence of asymptomatic AF recurrence after catheter ablation, in 51 patients who had previously undergone pacemaker implantation for sick sinus syndrome [5]. They measured the AF recurrence rate using a 'conventional' follow-up in the form of 12 lead ECG, Holter monitor and event recorder and compared this to the recurrence rate observed when conventional follow-up was complemented by annual pacemaker interrogation. All participants in this study underwent a comprehensive ablation protocol that allowed antiarrhythmic drugs to be systematically discontinued after the procedure. Following wide encircling pulmonary vein isolation, adenosine was used to unmask dormant connection and isoproterenol and burst pacing were used to identify inducible AF. Positive outcomes in these tests served as a basis for further ablation. During follow-up, pacemaker detected AF was defined as a sudden increase in heart rate above the programmed mode switch rate of 170bpm, that lasted more than 30 seconds, and that was confirmed by a manual review of the electrogram. Ultimately, device interrogation demonstrated an incremental detection of asymptomatic AF. The authors reported that the 5-year AF free survival rate after a single procedure was 86% using conventional follow-up compared to 58.6% when pacemaker interrogation was also used, although this did not reach statistical significance. However, this difference was highly significant in patients undergoing multiple procedures, with AF free survival rates of 60.9% and 40.6% respectively.

The topic of subclinical AF is particularly relevant to individuals undergoing curative catheter ablation. Since the procedure is generally reserved for highly symptomatic patients, procedural success is often defined by an absence of symptomatic recurrence. In this sense, there may be a tendency in patients to assume that a lack of AF-related symptoms translates into a diminished thromboembolic risk. On the contrary, the findings in this study reinforces earlier research demonstrating that a substantial proportion of patients undergoing ablation have exclusively asymptomatic recurrences [6]. Moreover, the failure to identify an independent

clinical predictor of these asymptomatic episodes suggests that risk stratifying patients to determine who should receive more rigorous monitoring may not be a feasible option. This result is consistent with other studies that have failed to reproducibly isolate any patient characteristic that holds a significant predictive value [6,7]. This shortcoming leads to another important point that is evident from the results of this study, but perhaps underemphasized by the authors. Utilisation of implantable cardiac devices may represent the only method of arrhythmia monitoring that yields an adequate detection rate for asymptomatic recurrence. For example, two-third of patients with AF recurrences were asymptomatic and in patients undergoing multiple catheter ablations, 10 of the 11 asymptomatic AF recurrences were only detected by pacemaker interrogation. Of course, some perspective is required here, since the minimum duration of AF that constitutes a significant stroke risk remains unclear. In this study, the median maximum AF duration during asymptomatic episodes was only 1 hour as opposed to 15 hours for symptomatic episodes. The current guidelines recommend centring anticoagulation decisions around the patient's thromboembolic risk profile rather than procedural success [8]. In this regard, identifying all asymptomatic episodes may not be important. Nevertheless, there are several retrospective and prospective studies showing that cessation of anticoagulation in selected patients after successful catheter ablation for AF may not be associated with increase in stroke risk [9]. The use of continuous monitoring may provide useful clinical information in such cases. Furthermore, as catheter ablation techniques for AF are becoming more refined, studies are being performed to assess changes in hard end points such as stroke and death. The current AF recurrence definition lacks a physiological basis and AF ablation studies with continuous rhythm monitoring may provide invaluable information to redefine AF recurrence in the future.

In terms of procedural success, the authors must be commended on the 5-year, single-procedure arrhythmia free survival rate of 86% using conventional monitoring. This compares extremely favourably to the results of a recent meta-analysis, which yielded a pooled estimate of 66.6% for single procedure freedom from paroxysmal AF at 1 year [10]. Nevertheless, when pacemaker detected episodes are also considered, the 39.1% five-year recurrence rate serves as a poignant reminder that even the most comprehensive ablation procedures have limited long-term success, and reinforces the recent recommendation for risk factor management in patients undergoing AF ablation [11–13].

In conclusion, the study by Osaka Y et al. progresses an evolving field of continuous cardiac monitoring and subclinical arrhythmia detection. It reminds us that asymptomatic AF recurrence after catheter ablation is common and that clinicians need to remain vigilant, particularly if they are considering discontinuing anticoagulation. Still, questions remain as to which patients should

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undergo an intensive rhythm monitoring strategy as well as to the duration of AF that is clinically significant. The recent surge in studies incorporating implantable cardiac devices will hopefully bring some clarity to this issue.

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### References

- [1] Passman RS, Weinberg KM, Freher M, Denes P, Schaechter A, Goldberger JJ, et al. Accuracy of mode switch algorithms for detection of atrial tachyarrhythmias. *J Cardiovasc Electrophysiol* 2004;15(7):773–7.
- [2] Healey JS, Connolly SJ, Gold MR, Israel CW, Van Gelder IC, Capucci A, et al. Subclinical atrial fibrillation and the risk of stroke. *N Engl J Med* 2012;366(2):120–9.
- [3] Glotzer TV, Daoud EG, Wyse DG, Singer DE, Ezekowitz MD, Hilker C, et al. The relationship between daily atrial tachyarrhythmia burden from implantable device diagnostics and stroke risk: the TRENDS study. *Circ Arrhythm Electrophysiol* 2009;2(5):474–80.
- [4] Van Gelder IC, Healey JS, Crijns H, Wang J, Hohnloser SH, Gold MR, et al. Duration of device-detected subclinical atrial fibrillation and occurrence of stroke in ASSERT. *Eur Heart J* 2017;38(17):1339–44.
- [5] Osaka Y, Takigawa M, Takahashi A, Kuwahara T, Okubo K, Takahashi Y, et al. The proportion of asymptomatic recurrence after catheter ablation of atrial fibrillation in patients with a pacemaker for sick sinus syndrome. *Indian Pacing Electrophysiol J* 2017;17(5):125–31.
- [6] Hindricks G, Piorkowski C, Tanner H, Kobza R, Gerdts-Li J-H, Carbuicchio C, et al. Perception of atrial fibrillation before and after radiofrequency catheter ablation. Relevance of asymptomatic arrhythmia recurrence. *Circulation* 2005;112(3):307–13.
- [7] Verma A, Champagne J, Sapp J, Essebag V, Novak P, Skanes A, et al. Discerning the incidence of symptomatic and asymptomatic episodes of atrial fibrillation before and after catheter ablation (DISCERN AF): a prospective, multicenter study. *JAMA Intern Med* 2013;173(2):149–56.
- [8] Calkins H, Hindricks G, Cappato R, Kim YH, Saad EB, Aguinaga L, et al. HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation. *Heart Rhythm* 2017. <http://dx.doi.org/10.1016/j.hrthm.2017.05.012> (In Press).
- [9] Mahajan RPR, Lim HS, Willoughby SR, Sanders P. Does catheter ablation of atrial fibrillation eliminate the need for anticoagulation? *Interv Cardiol Lond* 2013;5(2):171–8.
- [10] Ganesan AN, Shipp NJ, Brooks AG, Kuklik P, Lau DH, Lim HS, et al. Long-term outcomes of catheter ablation of atrial fibrillation: a systematic review and meta-analysis. *J Am Heart Assoc* 2013;2(2):e004549.
- [11] Pathak RK, Middeldorp ME, Lau DH, Mehta AB, Mahajan R, Twomey D, et al. Aggressive risk factor reduction study for atrial fibrillation and implications for the outcome of ablation: the ARREST-AF cohort study. *J Am Coll Cardiol* 2014;64(21):2222–31.
- [12] Mahajan R, Lau DH, Brooks AG, Shipp NJ, Manavis J, Wood JP, et al. Electrophysiological, electroanatomical, and structural remodeling of the atria as consequences of sustained obesity. *J Am Coll Cardiol* 2015;66(1):1–11.
- [13] Mahajan R, Pathak RK, Thiyagarajah A, Lau DH, Marchlinski FE, Dixit S, et al. Risk factor management and atrial fibrillation clinics: saving the best for last? *Heart, Lung Circulation* 2017;26(9):990–7.

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