Ablation of atrial fibrillation

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Chapter 4

What does the blanking period blank?

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LETTER TO THE EDITORS

Background

In recent years, pulmonary vein isolation (PVI) has become an accepted treatment for paroxysmal, drug-refractory atrial fibrillation (AF). According to the Expert Consensus Statement on Catheter and Surgical Ablation of Atrial Fibrillation, the first three months after any form of myocardial ablation should not be taken into account when reporting procedural outcomes. This "blanking period" has become universally recognized, but it is not well grounded. The early recurrences of arrhythmia such as AF, left atrial tachycardia, atrial flutter are defined as ERAT, reported to occur in up to 40% of patients and they are considered temporary and benign. However, half of these patients, with symptomatic ERAT after ablation will have later relapses(1-4). Also, a part of arrhythmic episodes occur asymptomatically, making continuous monitoring an absolute condition to report the incidence and predictive value of ERAT during the blanking period(1).

Discussion

Several mechanisms (atrial local inflammation, increased adrenergic tone and changes in fluid and electrolytes balances) play a role in determining the transient increase in the risk of post-procedural atrial tachyarrhythmias occurring early after ablations. Therefore, a blanking period of 3 months after any form of PVI has been accepted, because of the difficulty to distinguish true early recurrences from transient ERAT related to peri-procedural reversible causes(1-4). The question is on which scientific proof experts have set this time-window. Currently, there is consistent evidence that ERAT mainly occurs during the first two weeks(5-7). In a very thorough analysis, Joshi et al. have investigated the blanking period during the first three months, continuously monitoring the rhythm with loop-recorders in patients suffering from highly symptomatic lone AF. They reported that ERAT after transcatheter PVI occurred mainly within the first two weeks(2), as Oral already stated in 2002(6).

Koyama et al. reported that the freedom from arrhythmia at 6 months after percutaneous ablation for paroxysmal AF was 76% in patients who had ERAT during the first 3 days, while was only 30% in patients with ERAT within 4-30 days(7). Evidently, immediate AF recurrence has a different mechanism and impact on midterm outcomes. Acute inflammatory changes after ablation may be responsible for immediate recurrence, since application of ablative energy in atrial tissue has a pro-inflammatory effect and thus potentially pro-arrhythmogenic (e.g. modification of action potential duration of atrial and pulmonary veins myocardium)(9). Markers of inflammation (IL-6 and CRP) have shown to be significantly increased only in the first week (at day 2 and 7) after the procedure(9). Accordingly, low post-operative dose of corticosteroids proved effective and safe in preventing mid-term AF recurrences(10).

The ERAT within 3 months following catheter ablation are observed with a prevalence varying from 35% to 65%. The incidence of ERAT is highest in the immediate postablation period and progressively decreases thereafter(5-7). Again, patients with ERAT after percutaneous ablation were significantly less likely to have long-term freedom from recurrent AF than patients without ERAT. Two interesting findings should be noted: first, the significance of ERAT as predictor of late recurrences becomes more significant after the first month. Such time-dependence of the predicting value of the ERAT relates with the pro-arrhythmic effect of the ablations, again mainly mediated by the inflammatory cascade, which progressively wanes off. Consequently, the time of occurrence of the first relapse impacts mid-term outcomes, since patients who had ERAT within 4 weeks had better outcomes than those with later recurrence. Predicting which early arrhythmias will eventually lead to late recurrences deserves focused research; patient selection plays a key role as well as independent predictors of failure (increased age, hypertension, persistent/permanent AF, left atrial enlargement and incomplete transmurality)(11).

Finally, there is the issue of edema in the anatomical region where ablation energy is delivered. In a pig model it has been demonstrated that tissue edema, following linear ablations in the right atrium, resolved within 4 weeks(12). Also, the important study of Okada et al., investigating edema in the left atrium after transcatheter radiofrequency PVI, has showed that, although edema is formed in the ablated and surrounding tissue within seconds following ablation, this is no longer present at 1 month follow-up(13).

In conclusion, a number of issues suggest that the 3-month blanking period is too long. Among them, the most valid one is that the inflammation process after PVI tends to resolve in about 1 week, tissue edema following ablation disappears within one month and that recurrences occurring during the first month do not correlate with long-term failures. A blanking period of 4 weeks after ablations (either surgical or transcatheter) appears therefore reasonable and should not be intended as a clinically useless period. Instead of masking, future trials may consider to monitor ERAT and report their timing as independent endpoints.

The first month thoroughly monitored should be a reliable prediction tool and ERAT can identify patients at high risk of true recurrence in whom a firm management of the rhythm (early cardioversions, repeated ablations) may be appropriated. The current blanking period seems to be more expert than evidence based. Even if the currently accepted blanking period of 3 months could preserve patients from undue early re-ablations, what does it actually blank?

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