



Přehledový článek | Review article

Follow-up of patients after catheter ablation of atrial fibrillation and their clinical management

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ABSTRACT

ECG monitoring after catheter ablation is a necessary part of care of patients with atrial fibrillation. A significant number of patients after catheter ablation of atrial fibrillation have sooner or later arrhythmia recurrence. The riskier the patient, the bigger the impact of a potential arrhythmia and the more intensive effort to monitor ECG after ablation should be made. An integral part of follow-up of patients after catheter ablation is not only monitoring for potential arrhythmia recurrence but also monitoring for complications of ablation, antiarrhythmic and antithrombotic drugs prescription, influencing of atrial fibrillation development risk factors and considering reablation.

SOUHRN

Monitorace EKG po katetrizační ablaci je nezbytnou součástí péče o pacienty s fibrilací síní. Nezanedbatelné procento pacientů po katetrizační ablaci fibrilace síní má v kratším či delším časovém horizontu recidivu arytmie. Čím je pacient rizikovější, tím větší bude dopad případné arytmie, a tím intenzivnější by měla být snaha o monitoraci EKG po ablaci. Součástí sledování pacientů po ablaci je kromě monitorace případných recidiv arytmie i pátrání po komplikacích ablace, preskripce antiarytmické medikace, antitrombotické léčby, ovlivnění rizikových faktorů vzniku FS a indikace případné reablace.

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Monitoring of the rhythm after catheter ablation

ECG monitoring after catheter ablation is a crucial component of management of patients with atrial fibrillation (AF). Symptoms described by the patients themselves can be quite misleading. Palpitations, clinically suggestive of AF recurrence, may be caused by mere supraventricular or ventricular extrasystoles – the diagnosis of AF recurrence thus cannot be based solely on the subjective de-

scription of heart pounding [1]. On the other hand, extensive monitoring of patients after ablation has shown that AF recurrences can be truly asymptomatic [2]. When assessed just with respect to subjective complaints, ablation in these asymptomatic patients can be falsely judged as successful.

Ablation is considered successful if the patient is free from documented recurrence of arrhythmia between 3 (the initial transitional period) and 12 months after the procedure without taking any antiarrhythmic medication.

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Long-term success is defined as absence of arrhythmia 36 months after the ablation without any antiarrhythmic medication. Partial success can be defined by at least 75% reduction in the frequency and/or duration of paroxysms of arrhythmia in comparison to the pre-ablation interval. Any arrhythmia to be considered AF recurrence after ablation must have a documented duration of at least 30 seconds and must occur later than 3 months after the procedure. AF recurrence within the initial 3 months is considered an early recurrence and may not be associated with other AF recurrences in more distant future (see below).

ECG monitoring after ablation can be performed using both continuous and discontinuous recordings. The more extensive monitoring (more frequently acquired and/or longer ECG recordings), the higher is the probability of documenting arrhythmia recurrence [3]. Discontinuous recordings include planned ECGs during scheduled follow-up visits, ECGs acquired *ad hoc* because of clinical complaints, 24h to 7D Holter ECG monitoring and external loop recorders. The use of regular 7D Holter ECG recordings plus ECGs acquired because of patient complaints makes it possible to detect about 70% of AF recurrences after ablation [4].

Continuous monitoring refers to monitoring for one or more years, which was made possible by implantable devices. The presence of AF can classically be detected by a cardiac stimulator or by defibrillator with an atrial electrode [5]. An implantable loop-monitor, offering the possibility to detect paroxysmal AF during several years, is also available [6].

The standard follow-up in our institution includes an ambulatory ECG monitoring aimed at detecting AF recurrences using 7D Holter-ECG after 3, 6, 9, and 12 months following the ablation. In general, the motivation to detect possible AF recurrence is higher in patients with higher risk of medical complications associated with paroxysmal arrhythmia. In other words – the higher risk in a given patient, the more dangerous the expected consequences of possible arrhythmia, the more intensive is the effort to monitor and to detect ECG abnormalities following the ablation.

Recurrences of arrhythmia after ablation

Recurrences of AF often occur shortly after ablation. Absence of recurrence in the early post-ablation period is associated with higher rate of success – 85% of patients free from AF recurrence until 2 weeks after ablation of paroxysmal AF remain recurrence-free for another 12 months [7]. When assessing the first 6 weeks after ablation, the absence of recurrence is associated with markedly higher rate of sinus rhythm (SR) maintenance for the rest of the first post-ablation year (84% vs. 38%) [8]. Early recurrences (< 3 months post-ablation) have been linked to a higher risk of late recurrences [9] and it does not matter when the recurrence is noted within the first 3 months [7]. Despite this generally higher risk, however, up to 60% patients with early AF recurrence are free from another AF recurrence after 3 months following the ablation. The first three months post-ablation are thus viewed

as a transitional period during which AF recurrences are not always considered treatment failure.

Most AF recurrences after ablation are caused by re-connection of pulmonary veins (PVs). Some early AF recurrences may be caused by an inflammatory reaction at the site of radiofrequency energy application [10] or by delayed effect of radiofrequency (RF) ablation (“delayed healing”) [11]. In some cases, arrhythmias may even be triggered by temporary dysbalance of autonomous nervous system following the ablation [12]. As many as 15% of patients complain of higher than pre-ablation AF paroxysm rate [13]. These transitional influences may eventually form the basis of long-term absence of arrhythmia even in patients with documented early AF recurrence after catheterization.

Inflammatory process may thus be one of the possible causes of early post-ablation AF recurrence. The possibility of its alleviation and of AF recurrence reduction was assessed in a randomized study [14]. At the day of ablation, corticosteroids were given intravenously, followed by oral administration of prednisolone for 3 days. Early recurrence within 3 days of ablation was assessed and was found to be lower in the group treated with corticosteroids. Patients treated with corticosteroids also had lower number of recurrences 14 months post-ablation (85% vs. 71%). Despite data from this trial, peri-ablation corticosteroid use has not become a part of common clinical practice.

When AF recurrence does occur in the early transitional period, it is prudent to aim at restoring the SR. Persistent AF leads – as early as after 24 hours – to anatomical and electric remodeling changes in the atrial myocardium, facilitating the persistence of re-entry circuits and increasing the activity of AF triggers. These changes further add to the persistence of arrhythmia and form a vicious circle, markedly supporting the long-term AF persistence [15,16]. Cardioversion for persistent arrhythmias within 30 days of ablation is associated with higher rate of long-term SR maintenance [17].

Antiarrhythmics are given to all patients for the above reasons for at least 3 months post-ablation in many centers [13]. This short-term antiarrhythmic therapy is associated with decrease in the number of early AF recurrences following ablation. On the other hand, it has no influence on delayed AF recurrences [8]. It is thus not quite clear whether it is necessary to keep patients after the AF ablation on *temporary* antiarrhythmic treatment. While the early transitional post-ablation period of stabilization is bridged with less arrhythmia recurrences, long-term recurrences remain uninfluenced by the initial temporary antiarrhythmic therapy. When antiarrhythmics are given persistently, long-term recurrences decrease, of course, but the possibility to refrain from antiarrhythmic treatment is one of the goals of ablation. In our center, we discontinue antiarrhythmics in all patients following ablation of paroxysmal AF; individual approach is adopted after ablation of persistent AF.

About 20% of patients who were free from AF recurrence for 1 year post-ablation experience the arrhythmia recurrence within the next 1–4 years [18,19]. The highest probability of delayed AF recurrence is noted in patients with a history of persistent AF before the ablation [20].

Antiarrhythmic therapy is initiated in our center following post-ablation AF recurrence, preferably choosing antiarrhythmics that were well tolerated before ablation; should another recurrence occur or should antiarrhythmics be poorly tolerated, re-ablation is indicated. If arrhythmia recurrence is diagnosed in patients with paroxysmal AF who don't wish to be on long-term antiarrhythmic medication, re-ablation is indicated even without trying antiarrhythmics. Individual approach is certainly always warranted. In our center, 81% of patients in the past year were free from AF recurrence 12 months after the ablation of paroxysmal AF, 89% of which were without any antiarrhythmic therapy 1 year post-ablation.

AF recurrences following ablation can be expected in 20–40% of patients [21]. Since up to 60% of patients with early AF recurrence within 3 months post-ablation have no other AF recurrences, re-ablation should not be indicated before 3 months after the procedure. Exception can be made in patients with highly symptomatic atrial tachycardia that does not respond to antiarrhythmics and recurs after cardioversion. Re-ablation can clearly be performed earlier in these cases.

Anticoagulation following catheter ablation

With respect to extensive application of radiofrequency energy leading to coagulation necrosis and subsequent scar formation following ablation, it is necessary to use anticoagulation therapy in the early post-ablation period. It is not clear, however, whether it is necessary to continue the anticoagulation therapy for more than 2–3 months. According to the current recommendation [22], long-term anticoagulation following AF ablation is indicated in patients with high risk of thromboembolic (TE) complications according to CHADS₂ or CHA₂DS₂-VaSc score not taking into account SR maintenance or absence during follow-up. Anticoagulation should be continued even in patients without documented AF recurrence post-ablation because 1) delayed AF recurrences can occur and 2) many AF paroxysms following the ablation are asymptomatic. Patients with higher TE risk would thus not have adequate protection from TE complications, especially from stroke, in case of undiagnosed arrhythmia recurrence. On the other hand, long-term anticoagulation is associated with the risk of bleeding, its use decreases the quality of life [23] and according to some smaller studies, patients after AF ablation have low risk of TE complications after anticoagulation is discontinued [24,25]. Since we have no data from any larger randomized clinical trial assessing the safety of early discontinuation of anticoagulation treatment post-ablation yet, we should respect the above recommendation to continue the anticoagulation according to the TE risk, not according to the documented SR maintenance. While anticoagulation should thus be recommended to all patients with a higher TE risk, one can still adopt the individualized approach and discontinue the anticoagulation after 3 months in a patient with persistent SR following ablation who does not wish to be anticoagulated. Intensive monitoring of possible asymptomatic AF recurrences is necessary in these cases with anticoagulation treatment strategy reassessment in case that recurrence is detected.

This approach is supported by data from a multicenter observation trial comprising 3,444 patients who underwent AF ablation. Anticoagulation was discontinued in all patients without documented AF recurrence and without mechanical left atrial dysfunction. Patients were kept on ASA after anticoagulation had been discontinued; it was reinstalled in case of AF recurrence with respect to the TE risk according to the CHADS₂ score. None of the treated patients experienced a significant TE complication [26].

Other pharmacotherapy after catheter ablation

During ablation performed on the posterior wall of the left atrium, the ablation catheter can get to the vicinity of esophagus; esophageal ulcerations can be found endoscopically in some patients post-ablation. Given the fact that atrioesophageal fistula formation is a rare, yet a highly dangerous complication (incidence 0.1–0.25%, mortality over 80%), proton pump inhibitors are administered empirically in many centers for 1–4 weeks following the ablation. We administer omeprazole to all patients who underwent AF ablation for 4 weeks despite the fact that esophagus is directly visualized using intracardiac echocardiography during every ablation procedure.

It is also necessary to aim at influencing the risk factors for AF, especially arterial hypertension, obesity and sleep apnea syndrome. Treatment for these diagnoses should form an integral part of care for patients with AF. So far, no convincing data are available that would confirm any significant impact of “up-stream” therapy following AF ablation. Administration of ACE inhibitors in the context of prospective patient registry was not associated with more successful long-term SR maintenance after ablation of paroxysmal or persistent AF [27].

Complex follow-up of patients after catheter ablation

Each patient who underwent AF ablation should be followed-up extensively in the medical center where the procedure was performed and where there is sufficient experience with possible complications. Control ECG should be obtained before the patient is discharged and in case that arrhythmia recurrence is detected, attempts should be made to cure the arrhythmia before the patient is to be followed on the outpatient basis. We follow all our patients who underwent AF ablation telemetrically until the end of hospitalization.

To exclude possible severe early complications of the ablation, it is always necessary to perform a control transthoracic echocardiography, looking especially for possible pericardial effusion. When hematoma and/or resistance is present in the location where the groin was cannulated, it is prudent to exclude pseudoaneurysm of the femoral artery or arteriovenous fistula sonographically.

Atrioesophageal fistula usually manifests clinically 2–4 weeks post-ablation as a fever accompanied by neurological symptoms caused by septic emboli or, in more severe cases, as a septic shock. If this condition is suspected, CT

or MR scans of esophagus are the diagnostic methods of choice [28,29]. Swallowing of barium paste has a low sensitivity. Endoscopy should not be performed (when performed, the highest caution is necessary) since filling the esophagus with air can lead to massive air embolization to the CNS.

Development of significant pulmonary vein stenosis has become much less frequent with ablations being performed further from the pulmonary vein ostia (using wide antral circumferential ablation). Routine screening for pulmonary vein stenosis post-ablation is thus being performed in very few centers nowadays. This complication has to be excluded, however, when suspicious clinical symptoms appear such as chest pain, dyspnea, cough, hemoptysis, recurrent pulmonary infections or signs of pulmonary hypertension [30,31]. Cardiac CT or MR or possibly ventilation/perfusion scan is warranted in these cases.

Beside the search for possible complications, we have to provide adequate monitoring in order to exclude recurrences of the arrhythmia, prescription of antiarrhythmics, antithrombotic treatment and treatment of the risk factors for AF; re-ablation should also be indicated if necessary.

Conclusion

Significant proportion of patients after catheter ablation of atrial fibrillation experience arrhythmia recurrence during short-term or long-term follow-up. The intensity of ECG monitoring following the ablation should be proportional to the risk in the individual patient and to the expected impact of possible arrhythmia. While following the patients after ablation, we not only have to monitor for possible arrhythmia recurrences and ablation complications – we also have to prescribe the antiarrhythmics, provide antithrombotic treatment, treat the risk factors for AF and indicate possible re-ablation if necessary.

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