pISSN:2349-5707 Volume:13,Issue 2, February -2026 eISSN:2349-5715

HEART RATE VARIABILITY AND HEART RATE DYNAMICS AFTER RADIOFREQUENCY CATHETER ABLATION

Abdulkhamidov A.A.
Prof. **Khujamberdiev M.A.**[1]
Impuls medical institute
Andijan state medical institute[1]

Relevance. Radiofrequency catheter ablation (RFCA) is one of the effective rhythm-control strategies for atrial fibrillation (AF) and certain other supraventricular arrhythmias. The procedural effect is not limited to elimination of arrhythmogenic foci: ablation can influence cardiac autonomic innervation and reflex control mechanisms, leading to autonomic re-adaptation in the early post-procedural period. In clinical practice, this is often reflected by changes in resting heart rate (HR) and shifts in heart rate variability (HRV) parameters.

Materials and methods. Within the scope of a literature review, clinical studies, systematic reviews, and consensus recommendations addressing autonomic changes after RFCA/pulmonary vein isolation (PVI) were analyzed. Key noninvasive markers of autonomic function were assessed using 24-hour Holter ECG–derived HRV indices (time domain: SDNN, RMSSD; frequency domain: HF, LF) and HR metrics (mean HR, nocturnal–diurnal difference, and recovery dynamics).

Results. Most sources report that the early post-RFCA period (first days to weeks) is frequently characterized by the following "autonomic profile":

1. A relative increase in HR (at rest and/or in the 24-hour average);
2. A reduction in HRV, particularly in indices sensitive to parasympathetic activity (e.g., RMSSD, HF);
3. In some cases, vagal responses during the procedure or immediately thereafter (bradycardia, blood pressure decline, transient conduction changes).

However, important limitations should be considered when interpreting these findings: HRV is highly sensitive to rhythm stability (measurement in sinus rhythm is preferable), β-blocker/antiarrhythmic dosing, pain–stress factors, sleep apnea, heart failure, and the timing of assessment (24–48 hours, 7 days, 1 month), among other confounders. Therefore, rather than using early HRV/HR changes as "independent prognostic markers," it is more appropriate to interpret them as part of a comprehensive assessment that accounts for clinical status, background therapy, and monitoring quality.

Conclusion. In the early post-procedural period after RFCA, HRV and HR dynamics may serve as accessible, noninvasive biomarkers reflecting re-adaptation of cardiac autonomic regulation. To enhance their clinical utility, standardization of assessment timing, control of confounders, and expansion of large prospective observational studies are needed.

References

1. Van Gelder IC, Rienstra M, Crijns HJGM, *et al.* 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J.* 2024;
2. Tzeis S, Gerstenfeld EP, Kalman J, *et al.* 2024 European Heart Rhythm Association/Heart Rhythm Society/Asia Pacific Heart Rhythm Society/Latin American Heart Rhythm Society expert consensus statement on catheter and surgical ablation of atrial fibrillation. *Europace.* 2024;
3. Tang LYW, Hawkins NM, Ho K, *et al.* Autonomic Alterations After Pulmonary Vein Isolation in the CIRCA-DOSE (Cryoballoon vs Irrigated Radiofrequency Catheter Ablation) Study. *J Am Heart Assoc.* 2021;

pISSN:2349-5707 Volume:13,Issue 2, February -2026 eISSN:2349-5715

4. Drexler M, Blum T, Heinroth KM, *et al.* Heart rate variability as a predictor of successful catheter-guided pulmonary vein isolation for atrial fibrillation. *Herz.* 2024;
5. Miyanaga S, Yamane T, Date T, *et al.* Impact of pulmonary vein isolation on the autonomic modulation in patients with paroxysmal atrial fibrillation and prolonged sinus pauses. *Europace.* 2009;