






Biomarker release after different single shot technologies – cryoballoon vs pulsed-field ablation

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KEYWORDS: cryoablation, electroporation, biomarkers release.

CITATION: *Cardiol Croat.* 2024;19(11-12):395. | <https://doi.org/10.15836/ccar2024.395>

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Introduction: Pulsed-field ablation (PFA) has shown promising data in terms of safety and procedural efficiency for pulmonary vein isolation (PVI), with similar long-term outcomes compared to cryoballoon ablation (CBA) in patients with atrial fibrillation (AF). Each modality induces distinct biological responses, resulting in varying degrees of tissue injury and inflammation but.^{1,2} This study aimed to determine the extent of myocardial injury and systemic inflammation following PFA and cryoballoon ablation using established biomarker: lactate dehydrogenase (LDH), C-reactive protein (CRP), and high-sensitivity troponin T (hs-cTnT).

Patients and Methods: The study included two groups of patients: one group undergoing cryoablation (N=57) and the other undergoing PFA (N=57). All patients are enrolled in an institutional registry (CaRD registry-Arrhythmias). Biomarker levels of LDH, CRP, and troponin were measured at baseline AND 18-24 hours after the ablation.

Results: In the cryoablation group, LDH levels increased significantly by 16.7% and in the PFA group, the increase in LDH was even more pronounced, with a rise of 59.1% (P < 0.001). For the cryoablation group, CRP levels increased by 113.5% and in the PFA group, the increase in CRP was far more substantial, with a rise of 1015.5 (P < 0.001). In the cryoablation group, troponin levels exhibited an increase of 53505.2% and similarly, in the PFA group, troponin levels increased by 44114.5 (P < 0.001).

Conclusion: The data demonstrate that both cryoablation and PFA result in significant increases in LDH, CRP, and troponin levels, indicating tissue damage and inflammation. However, PFA leads to a larger increase in LDH and CRP, suggesting a stronger inflammatory and cellular damage response compared to cryoablation. Conversely, both procedures cause profound elevations in troponin, indicative of cardiac injury, but the relative increase is higher in the cryoablation group which can be explained by gradual cell death in cryo group and wider affected area during ablation. Despite signs of higher tissue damage and inflammation in PFA group, the NT-proBNP showed a significant reduction after three months. Further studies are needed to fully understand the clinical implications of these biomarker changes and their impact on patient outcomes.

RECEIVED:
September 29, 2024

ACCEPTED:
October 31, 2024



LITERATURE

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