

## Difference of myocardial injury, inflammation and early recurrence after pulmonary vein isolation among laser balloon ablation, radiofrequency catheter ablation and cryoballoon ablation

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**Background:** Pulmonary vein isolation (PVI) has become well-established as the main therapy for patients with drug-refractory paroxysmal atrial fibrillation (PAF) and various isolation methods including radiofrequency ablation (RFA), cryoballoon ablation (CBA) and laser balloon ablation (LBA) were available. Pathological findings in each ablation methods such as myocardial injury and inflammation are thought to be different. High sensitive cardiac troponin I (hs-TnI), subunit of cardiac troponin complex, is a sensitive and specific marker of myocardium injury. High-sensitive C-reactive protein (hs-CRP) is a biomarker of inflammation and is elevated following cardiomyocyte necrosis. Relationship between myocardial injury and inflammation after ablation using RFA, CBA and LBA and early recurrence of atrial fibrillation (ERAF) remains unclear.

**Methods:** We enrolled consecutive PAF patients from Osaka Rosai Atrial Fibrillation (ORAF) registry who underwent PVI from January 2019 to October 2019. We compared the clinical characteristics including age, gender, hypertension, diabetes mellitus, history of heart failure, CHADS2Vasc score, renal function, serum BNP level and echocardiographic parameters including left ventricular dimensions, left atrial diameter (LAD) and left ventricular ejection fraction (LVEF) between RFA, CBA and LBA groups. We investigated the difference of relationship between myocardial injury marker (hs-TnI), inflammation markers (white blood cell change (DWBC) from post

to pre PVI, neutrophil-to-lymphocyte ratio change (DNLR) from after to before PVI and hs-CRP) at 36–48 hours after PVI and ERAF (<3 months after PVI) between each group.

**Results:** We enrolled 187 consecutive PAF patients who underwent PVI. RFA, CBA and LBA groups comprised 108, 57 and 22 patients, respectively. There were no significant differences of age, gender, hypertension, diabetes mellitus, history of heart failure, CHADS2Vasc score, renal function, serum BNP level and echocardiographic parameters between each group. Serum hs-TnI in RFA group and LBA group were significantly lower than in CBA group (2.643 ng/ml vs 5.240 ng/ml, 1.344 ng/ml vs 5.240 ng/ml,  $p<0.001$ ,  $p=0.002$ , respectively, Figure). DWBC was significantly higher in LBA group than CBA group (1157.3/ $\mu$ l vs 418.4/ $\mu$ l,  $p=0.045$ ). DNLR did not differ between each group. Hs-CRP in RFA group and LBA group were significantly higher than in CBA group (1.881 mg/dl vs 1.186 mg/dl, 2.173 mg/dl vs 1.186 mg/dl,  $p=0.010$ ,  $p=0.003$ , respectively, Figure). Incidence of ERAF was significantly higher in LBA group than RFA group (36.4% vs 16.7%,  $p=0.035$ ). Incidence of ERAF tended to be higher in LBA group than CBA group (36.4% vs 19.3%,  $p=0.112$ ).

**Conclusion:** LBA may cause less myocardial injury than RFA and CBA, on the contrary LBA may cause more inflammation than CBA. Incidence of ERAF in LBA was highest between each procedure.

