Introduction: The impact of activated automaticity of the myocardial sleeves in pulmonary vein (PV) during PV isolation by 2nd-generation Cryoballoon (CB) ablation on the atrial fibrillation (AF) recurrence remains unknown. We investigated the clinical impact of high frequent dissociated spikes and rapid firing in PV during 2nd-generation CB ablation procedure on the AF recurrence after procedure.

Methods: Seventy-four patients (55 male) who underwent PVI procedure using 2nd-generation CB were enrolled and followed for AF recurrence. Monitoring of the electrical activity in each PVs by multi-electrode ring-catheter was performed during 3-minutes cryoenergy applications. The impact of PV electrical activity on the AF recurrence were investigated in AF recurrence group (Rec-group) and Non-recurrence group (Non-Rec-group).

Result: The dissociated electrical activity was recordable during 3 minutes cryoenergy application in 55 PVs of 41 patients. The total number of dissociated spike in PVs was 5.8 ± 16.5 spikes per patient. Twenty-six percentile of patients had AF recurrences during follow-up of a median of 360 [232-410] days. There was no difference in number of activated PV (0.6 ± 0.6 vs 0.8 ± 0.9, p=0.235) and total number of dissociated spikes (3.7 ± 8.6 vs 6.6 ± 18.5, p=0.377) during cryoenergy application between Rec-group and Non-rec-group. Eight patients of Rec-group underwent the 2nd session ablation procedure. They had reconnection in 11 PVs and the only 2 reconnected PVs had previously presented the dissociated electrical activity in PV at the 1st session procedure. Furthermore, the rapid firing in PV during cryoenergy application had no clinical impact on the chronic AF recurrence after ablation (log-rank, p=0.643).

Conclusion: The activated electrical activity in PV during 2nd-generation CB application had no clinical impact on the AF recurrence.