Introduction: The left atrial (LA) roof ablation in addition to pulmonary vein isolation (PVI) is associated with improved clinical outcomes in patients with atrial fibrillation (AF). However, the feasibility and safety of the LA roof ablation using the cryoballoon has never been fully investigated. This study aimed to evaluate the LA roof ablation in addition to PVI by the cryoballoon application in patients with AF.

Methods: In our single center retrospective study, a total of 35 consecutive patients (male, n=21 (60%); mean age, 66±14 years) with paroxysmal or persistent AF (<1-year duration of single episode) were enrolled. Mean duration of AF was 9.7 ±15.4 months. Cryoballoon ablation was performed using a 28mm second generation cryoballoon. The first 20 patients underwent only PVI (PVI alone), and the remaining 15 patients underwent LA roof ablation in addition to PVI (LA roof ablation + PVI).

Result: In total, 8 patients (22.8%) were persistent AF (PVI alone: n=3 (8.5%), LA roof ablation + PVI: n=5 (14.4%)). Acute PVI success rate were 100% using an average of 4.7±0.8 cryoballoon applications and 11.5±1.8 minutes of cryoablation, and the average Nadir cryoballoon temperature was -49.6±4.3°C during freezing. Total procedure time and fluoroscopic time for PVI were 2.3±0.4 hours and 33.9±8.5 minutes respectively. No touch up ablations were necessary for PVI. One patient had adverse event of phrenic nerve injury during the right inferior PVI. Acute success in LA roofline generation was achieved in 13 patients (86% acute success rate). The LA roof ablation was achieved using an average of 3.4±1.2 cryoballoon applications and 7.0±2.1 minutes of cryoablation. The average Nadir cryoballoon temperature was -44.4±3.7°C during freezing. Total procedure time and fluoroscopic time for LA roof ablation + PVI were 2.4±0.3 hours and 29.4±9.0 minutes respectively. There were no significant differences in characteristic parameters between success and unsuccess LA roof isolation. Even though the LA roof isolation was unsuccessful, by adding LA roof application, we were able to achieve LA antrum PVI. No adverse events occurred during the LA roof ablation. During a median follow-up periods of 5.0±3.1 months (short observation period), 3 (15%) patients had recurrence of AF in PVI alone group. On the other hand, there has been no AF recurrence in the LA roof ablation + PVI group so far.

Conclusion: The LA roof ablation in addition to PVI can be achieved feasibility and safety using the cryoballoon. This approach may appear superior to PVI alone in patients with AF.