Introduction: Encircling wider PVI (pulmonary vein isolation) i.e., box PVI (box shaped encircling isolation of 4 PVs and the posterior wall (PW)) could be expected to obtain better outcome for some atrial fibrillation (AF) despite requiring more delicate procedure. However, the clinical course in patients performed box PVI have not fully elucidated. We investigated the difference of the recurrence rate among patients with various severities of the AF performed completion of the box PVI.

Methods: We enrolled 270 patients (73 in paroxysmal AF (paroAF), 165 in persistent AF (perAF), and 32 with repeat session (reAF) performed box PVI. Bidirectional blocks of both PVs including their carinas were confirmed in all patients, while the PW was isolated bidirectionally in 80.7% (218/270: 59 in paroAF, 132 in perAF, and 27 in reAF) patients (Bi-PWI), or isolated unidirectionally in 19.3% (52/270: 14 in paroAF, 33 in perAF, and 5 in reAF) patient (Uni-PWI).

Result: The AF free survival, which was comparable between Bi-PWI and Uni-PWI groups, was highest in the paroAF group. However, Bi-PWI was associated with lower AF recurrence in the perAF. The reAF group showed the highest AF recurrence independent of the complete PW isolation.

Conclusion: The PW isolation might be dispensable for paroAF, while the reAF might require beyond the PW isolation. On the other hand, bidirectional PW isolation in addition to the complete PVI could be crucial for perAF.