Introduction: The pulmonary vein-left atrium (PVLA) junction is considered to have arrhythmogenic properties by forming conduction block and conduction gap due to the non-uniform presence of muscle sleeves. However, it is difficult to observe the details of PVLA junction electrophysiologically with conventional electrode catheters or 3D mapping systems. We observed LAPV connection using High-resolution electroanatomical mapping.

Methods: Forty PVLA junctions were observed in 10 patients with paroxysmal atrial fibrillation using High-resolution electroanatomical mapping before and after balloon catheter ablation (Cryo balloon in 8 cases and laser balloon ablation in 2 cases).

Result: The length of the left superior PV (LSPV) sleeve was the longest, 35.1 ± 12.7 mm. The lengths of the left inferior PV (LIPV), the right superior PV (RSPV) and the right inferior PV (RIPV) sleeves were 35.1 ± 12.7 mm, 35.1 ± 12.7 mm and 35.1 ± 12.7 mm, respectively. Fourteen gaps were identified in 10 PVs of 40 PVs, and 14 block lines were identified in 13 PVs. Any electrically abnormal characteristics could not be identified in 27 PVs. Gaps and block lines were most frequently observed in RSPV (6 gaps and 5 blocklines). The number of gap and blockline were 2 and 4 in RIPV, 3 gaps and 3 blocklines in LSPV and 3 gaps and 2 blocklines in LIPV, respectively. Balloon ablations were performed completely including all gaps and blocklines, AF in only one case was recurred.

Conclusion: We observed PVLA junctions with the electrophysiological properties that might be arrhythmogenic using high density mapping.