**Introduction:** Left ventricular hypertrophy (LVH) predisposes patients to atrial fibrillation (AF) and is represented by ST-T segment depression (STD) in electrocardiogram. However, whether STD associates with AF recurrence after catheter ablation (CA) remains to be investigated. We assess whether STD in electrocardiogram, implicating LVH, correlates with AF recurrence after CA in persistent AF (PerAF) patients.

**Methods:** PerAF patients (n=136) undergoing CA were enrolled and were classified into 2 groups based on ECG findings: the presence of STD (STD[+], n=100) and the absence of STD (STD[−], n=36). LV wall thickness (LVWT), LA diameter (LAD), and E/e' (an index of LV diastolic function) in echocardiography, laboratory data, heart rate and AF recurrence were evaluated.

**Result:** Age was unchanged between STD[−] and STD[+] (63.0±10.5 vs. 66.4±9.7 y.o.). 48.5% patients had hypertension; blood pressure was well controlled and was unchanged between the two groups (119.4±15.6 vs. 123.5±18.3 mmHg). LVWT, LAD, E/e', serum NT–ProBNP levels, heart rate increased in STD[+] vs. STD[−] (by 6.4%, 6.5%, 21%, 136% and 18% respectively, *p<0.05). After CA, STD recovered in some cases; STD[+] was further classified into two groups: reversible STD (R-STD[+], n=22) and non–reversible STD (non–R–STD[+], n=14). LAD, NT-ProBNP levels and heart rate were unchanged, but LVWT and E/e' increased in non-R-STD[+] vs. R-STD[+] (by 21.4% and 34.3%, respectively). AF recurrence rate was 22.7% in total; the rate was unchanged between STD[−] (17%) and R-STD[+] (18%), but increased in non-R-STD[+] (64%, p<0.05).

**Conclusion:** STD can be a surrogate maker for AF recurrence in PerAF. Latent LVH and STD may be unmasked by high-frequency/irregular excitation in AF, but STD can be recovered after sinus rhythm restoration in some cases.