Introduction: Although it has been reported that the renal function can improve after catheter ablation of atrial fibrillation (AF), long-term changes in the renal function and its relationship to the rhythm outcomes have not yet been evaluated. We explored the five-year change in the estimated glomerular filtration rate (eGFR) in AF patients depending on the medical therapy and catheter ablation.

Methods: Among 1,963 patients who underwent AF catheter ablation and 14,056 with AF under medical therapy in the National Health Insurance Service database, we compared 571 with AF catheter ablation (59 ± 10 years old, 72.3% male, 66.5% paroxysmal AF) and 1,713 with medical therapy after 1:3 propensity score matching. All participants had five years of serial eGFR data (Chronic Kidney Disease-Epidemiology Collaboration [CKD-EPI] method).

Result: Catheter ablation improved the eGFR5yrs (p<0.001), but medical therapy did not. In 2,284 matched patients, the age (adjusted OR 0.98 [0.97-0.99], p<0.001) and AF catheter ablation (adjusted OR 2.02 [1.67-2.46], p<0.001) were independently associated with an improved eGFR5yrs. Among 571 patients who underwent AF ablation, freedom from AF/AT recurrence after the last AF ablation procedure was independently associated with an improved eGFR5yrs (adjusted OR 1.44 [1.10-2.04], p=0.043), especially in patients without diabetes (adjusted OR 1.78 [1.21-2.63], p=0.003, p for interaction=0.012). Although underlying renal dysfunction (<60 mL/min/1.73m²) was associated with atrial structural remodeling (adjusted OR 1.05 [1.00-1.11], p=0.046), it did not affect the AF ablation rhythm outcome.

Conclusion: AF catheter ablation significantly improved the renal function over a five-year follow-up, especially in patients maintaining sinus rhythm without pre-existing diabetes.