Introduction: Catheter ablation is a safe and effective treatment approach for patients with atrial fibrillation (AF). This study assessed and compared cost, length of stay (LOS), readmissions, direct-current cardioversion (DCCV), and repeat ablation between AF patients who underwent catheter ablation using the advanced irrigation with contact force radiofrequency (RF) THERMOCOOL SMARTTOUCH® SF (STSF) Catheter and Arctic Front Advance™ Cryoballoon (AFA-CB) Catheter.

Methods: Using the Premier Healthcare Database (PHD), patients aged ≥18 years who had an elective ablation procedure with a diagnosis of AF in an inpatient or outpatient setting from 2016-2018 were identified, with first procedure designated as the index ablation. Patients who had surgical ablation, valvular procedures, or a left atrial appendage occlusion procedure in the 12-month pre-index period were excluded. Based on a text search strategy with fuzzy logic technique, patients were classified into two groups: STSF and AFA-CB. A 1:1 propensity score matching (greedy match without replacement and 0.10 caliper) was performed to match patients in the two catheter groups on study covariates including patient demographics, comorbidities, procedural and provider characteristics. Generalized estimating equations (GEE) model with an exchangeable correlation structure with appropriate link (log for cost and LOS; logit for readmissions, DCCV, and repeat ablation) and distribution function (gamma for cost; negative binomial for LOS; binomial for readmissions, DCCV, and repeat ablation) were used to assess study outcomes. GEE analyses adjusted for hospital-level clustering and any covariate that emerged significant (standardized difference outside of 0.10 and -0.10 range) post-matching. Sensitivity analysis was performed by restricting the sample to those patients who had their index ablation procedure performed at hospitals that had ≥100 total ablations in the pre-index 12-month period.

Result: Among the 3,015 patients that met the study criteria, 1,720 were in the STSF group and 1,295 in the AFA-CB group. There were 848 matched patients each in the STSF and AFA-CB group, with the STSF group having ~17% lower total costs ($23,096 vs $27,682; p=<0.0001) and ~27% lower supply costs ($10,208 vs $13,816; p=<0.0001). A significantly lower likelihood of 4-6 month cardiovascular (CV)-related readmission (odds ratio [OR] = 0.460; 95% CI [confidence interval] = 0.220–0.959) was associated with STSF versus AFA-CB use. No significant differences in other outcomes were observed among the two technologies. Similar results were observed in the sensitivity analysis sample.

Conclusion: STSF catheter use for AF ablation was associated with significantly lower cost and lower likelihood of CV-related readmission as compared to the AFA-CB catheter.