Introduction: Open irrigation ablation catheters are now the standard in radiofrequency catheter ablation (RFCA) of atrial fibrillation (AF). Among various irrigation catheters, laser-cut slit-based irrigation system (Cool Flex and FlexAbility) has a unique design to cool the catheter tip more efficiently. We aimed to assess the safety of slit-based irrigation catheters regarding prevention of procedure-related ischemic complication in AF patients undergoing RFCA.

Methods: The analysis was performed with Korea University Medical Center Anam Hospital RFCA registry. Procedure-related ischemic complication was defined as ischemic stroke or transient ischemic attack (TIA) occurring within 30 days after RFCA. Patients were divided into 3 groups: non-irrigation, hole-based irrigation, and slit-based irrigation catheter groups.

Result: The KUMC registry consisted of 2,755 AF patients undergoing first RFCA. Non-irrigation, hole-based irrigation, and slit-based irrigation catheters were used in 290, 1,375, and 1,090 patients, respectively. As compared with non-irrigation and hole-based irrigation catheter groups, slit-based irrigation catheter group had significantly older age, higher prevalence of non-paroxysmal AF, large left atrial size, and decreased left atrial appendage flow velocity. The CHA2DS2-VASc score was not different among the 3 groups. Procedure-related ischemic complication occurred in 15 patients (0.5%) with 14 ischemic strokes and 1 TIA event. Stroke and TIAs occurred in 5/290 (1.7%), 10/1375 (0.7%), and 0/1090 (0.0%) patients in non-irrigation, hole-based irrigation, and slit-based irrigation catheter groups, respectively (p = 0.001). Slit-based irrigation catheter was superior in direct comparison with non-slit-based irrigation catheters (p = 0.005).

Conclusion: Laser-cut slit-based irrigation catheters were highly effective in preventing procedure-related ischemic complications.