Periprocedural Acute Kidney Injury in Patients With Structural Heart Disease Undergoing Catheter Ablation of Ventricular Tachycardia: Incidence, Predictors and Impact on Outcomes

Ling Kuo
Daniele Muser
Yasuhiro Shirai
Robert D. Schaller
Matthew Hyman
Ramanan Kumareswaran
Jeffrey Arkles
Gregory E. Supple
David S. Frankel
Fermin Garcia
Cory Tschabrunn
Saman Nazarian
Sanjay Dixit
David Lin
Michael P. Riley
David, J Callans
Rajat Deo
Andrew Epstein
Erica S. Zado
Francis E. Marchlinski
Pasquale Santangeli

Introduction: Catheter ablation of ventricular tachycardia (VT) in patients with structural heart disease has risk of significant periprocedural hemodynamic derangements, which may affect end-organ perfusion and precipitate acute kidney injury (AKI). The clinical significance of periprocedural AKI in patients with structural heart disease undergoing VT ablation has not been previously investigated. This study sought to examine the impact of periprocedural AKI in patients with structural heart disease undergoing VT ablation.

Methods: We included a total of 317 consecutive patients with structural heart disease (age 64±13 years, mean LVEF 33±13%, 55% ischemic cardiomyopathy) undergoing catheter ablation of VT at our institution between 2010 and 2013, who had serial assessments of serum creatinine levels pre- and post-procedure. Ablation was guided by activation/entrainment mapping for tolerated VT and pacemapping/targeting of abnormal electrograms for unmappable VT. Periprocedural AKI was defined as an absolute increase in creatinine of ≥ 0.3 mg/dl within 48 hours or an increase of ≥ 1.5 times the baseline values within 1 week post-procedure.

Result: Periprocedural AKI occurred in 31 (10%) patients. Predictors of AKI included atrial fibrillation (OR 3.74, 95% CI 1.66 to 8.42, P=0.001), periprocedural acute hemodynamic decompensation (OR: 5.04, 95% CI 1.76-14.40, P=0.003), and use of angiotensin converting enzyme inhibitor/angiotensin II receptor blockers (OR 3.11, 95% CI 1.16 to 8.38, P=0.024). After a median
follow-up of 39 months (interquartile range 6 to 65 months), 95 (30%) patients died. Periprocedural AKI was associated with increased risk of early mortality (within 30 days, hazard ratio [HR] 9.91, 95% CI 2.87-34.27, P<0.001) and late mortality (within 1 year) following the procedure (HR 3.81, 95% CI 1.77-8.20, P=0.001) (Figure). After multivariable adjustment, AKI remained independently associated with increased risk of early and late mortality (HR 7.99, 95% CI 2.13-29.93, P=0.002 and HR 2.95, 95% CI 1.25-7.00, P=0.014, respectively).

**Conclusion:** Periprocedural AKI occurs in at least 10% of patients with structural heart disease undergoing VT ablation, and is strongly associated with increased risk of early and late post-procedural mortality. Serial assessments of kidney function following the procedure should be considered in this population, and defining strategies to minimize the risk of periprocedural AKI is crucial.