Renal Artery Revascularization in Patients with Atherosclerotic Renal Artery Stenosis and Chronic Kidney Disease

Faina Gurevich, MD, Aldo Peixoto, MD

Background: Atherosclerotic renal artery stenosis (ARAS) is a common cause of chronic kidney disease (CKD) and refractory hypertension. Delaying progression of renal dysfunction and improving blood pressure control are critical tasks in ARAS management. The benefit of renal artery revascularization with or without stenting is a subject of controversy. It remains uncertain whether renal revascularization leads to improved outcomes in ARAS, especially in patients with underlying renal dysfunction.

Specific Aim: To compare renal, hemodynamic and mortality outcomes of renal artery stenting vs. medical therapy in a cohort of veterans with ARAS and CKD.

Hypothesis: No significant difference will be observed in renal function, hemodynamic parameters and mortality between the medical therapy group and renal artery stenting group.

Methods: We conducted a retrospective cohort study at the VA Connecticut Healthcare System. Using the electronic medical records, we screened 773 patients with ICD-9 codes for renal artery atherosclerosis between 1998 and 2007. A total of 118 subjects met the eligibility criteria and were included, 71 in the medical group and 47 in the intervention group. The eligibility criteria included: a diagnosis of ARAS and the presence of CKD, not on dialysis (15ml/min<GFR<60ml/min/1.73m²); at least 3 month of follow-up; and no prior renal artery angioplasty or stenting or renal artery surgeries. The study’s primary endpoint was the change in renal function over the first 12 months of follow-up, measured as percent change in GFR. Secondary endpoints included the percent change in GFR at 24 and 36 months of follow-up, blood pressure control at 12, 24 and 36 months; the intensity of anti-hypertensive agents used, as defined by “defined daily doses” (DDD) at 12, 24, and 36 months; total mortality and progression to ESRD. Data were collected for up to 10 years. Univariate and multivariate models were created for analysis.

Results: Patients in both groups had similar baseline clinical characteristics: mean age was 73.2 years, predominantly male (97.4%) and Caucasian (95.8%), with similar baseline GFR (37.2+-15 ml/min/1.73m²) and prevalence of co-morbidities, with only exception being higher diastolic blood pressure in the stenting group (75+/-11 vs. 70+/-10, p=0.03). The average total follow-up was 34 months. There was no difference in GFR change at 12 months (-0.4%+-27% in the medical group vs. -4%+-28% in the intervention group, p=0.54). Moreover, there was no difference in change in GFR at 24 and 36 months between the groups. There was also no significant difference in blood pressure and DDD of anti-hypertensive therapy. Mortality rates were initially found to be lower in the medical group compared with the stenting group (24% versus 43%, p=0.03), but this difference did not persist on multivariate analysis. Progression to ESRD was similar in the two groups.

Conclusions: In this historical cohort study of ARAS in CKD, medical therapy and renal artery stenting resulted in comparable clinical outcomes. Our results caution against the use of renal artery stenting in patients with underlying kidney disease.