

Transplant Renal Artery Stenosis: A Treatable Cause of Resistant Hypertension and Renal Allograft Dysfunction

¹Ekamol Tantisattamo, MD, FASN; ²Praveen Ratanasrimetha, MD; ³Siwadon Pitukweerakul, MD; ¹Aneesha A. Shetty, MD, MPH; ¹Lorenzo Gallon, MD

¹Division of Nephrology and Hypertension, Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois

²Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand 10700

³Department of Internal Medicine, Presence St. Francis Hospital, Evanston, Illinois

Objectives: Atherosclerosis is the most common cause of transplant renal artery stenosis (TRAS). It is unknown whether therapeutic angioplasty and/or renal-artery stenting is superior to medical management for TRAS. With donor renal vascular manipulation or reconstruction and exposure to immunosuppression, the pathogenesis of RAS in renal transplant recipients may differ from non-transplant patients. We aim to identify potential risk factors of TRAS and outcomes after renal artery angioplasty and/or renal-artery stenting.

Methods: The new cases of TRAS from July 2014 to June 2015 in our institutes were reviewed. The renal transplant donors' and recipients' information and outcomes including renal allograft function, blood pressure (BP), and change in the number of blood pressure medications were reviewed. All patients underwent balloon angioplasty with/without stent placement.

Results: A total of 4 newly diagnosed TRAS were identified. Age at the time of diagnosis was 46.5 +/- 5.0 (SEM) years. All patients were African American and three were male. The most common cause leading to work up for TRAS was resistant hypertension. Mean serum creatinine at the time of diagnosis and after intervention were 2.2 +/- 0.3 and 1.9 +/- 0.2 mg/dL (p = 0.4372), respectively. All patients had the stenosis at the ostium of the transplant renal artery. Three donor kidneys were required arterial or venous reconstruction before anastomosed to the external iliac vessels and two of these kidneys were the right kidneys. Only 1 patient had normalized BP and decreased the number of BP medications (Table 1).

Conclusions: As the same to non-transplant patients, angioplasty +/- renal-artery stenting may not significantly improve renal allograft function or BP control in kidney transplant recipients. African American may be the risk factor of TRAS. Larger studies and interventional trials are required to determine the prevalence, risk factors, and therapeutic strategies for TRAS.

Table 1: The patients' and donor kidneys' data and outcomes

AA, African American; BP, blood pressure; DDRT, deceased donor renal transplantation; DGF, delayed graft function; ESRD, end-stage renal disease; F, female; HTN, hypertension; LRRT, living-related renal transplantation; M, male; No, number; PKD, polycystic kidney disease; Post-, post-angioplasty; Pre-, pre-angioplasty; PSV, peak systolic velocity; RA, renal artery; RAS, renal artery stenosis; RI, resistive index; SCR, serum creatinine; SGF, slow graft function; T2DM, type 2 diabetes mellitus; U/S, ultrasound

Pt	Cause of ESRD / Kidney transplant	Recipient co-morbidity / Smoking	Posttransplant complications	Time to diagnose RAS (months posttransplant)	Donor kidney side / RA reconstruction	Doppler renal U/S: PSV (cm/sec) / RI	Angiography: Site of RAS / Intervention	Outcomes					
								SCR		BP		No. of BP medication	
								Pre-	Post-	Pre-	Post-	Pre-	Post-
(1) 51 y/o AA M	HTN / DDRT	Prostate cancer / No	SGF	12	Left / 2 RA with Carrel patch	362-547 / 0.57	Ostium / Balloon + Stent	2.4	1.95	155 / 85	128 / 74	4	3
(2) 55 y/o AA F	T2DM / LRRT	HTN / No	• DGF requiring dialysis • RA thrombosis requiring thrombectomy on POD1	26	Left / None	250 / 0.66	Ostium / Balloon + Stent	1.7	1.75	160 / 65	209 / 92	4	4
(3) 48 y/o AA M	PKD / DDRT	HTN / No	None	3.5	Right / Anastomosis of the lower pole RA end-to-side onto the main RA	341 / 0.69	Ostium / Balloon	1.7	1.5	160 / 90	151 / 83	3	4
(4) 32 y/o AA M	HTN / DDRT	None / Yes	SGF	3	Left / 2 RA (cranial and caudal) in 1 aortic patch	395 / 0.63	The smaller caudal RA / Balloon	2.8	2.45	155 / 90	155 / 85	1	2