

Outcomes of Transplant Renal Artery Stenosis After Renal Artery Angioplasty and/or Stenting

Ekamol Tantisattamo, MD, FACP, FASN, FNKF¹; Praveen Ratanasrimetha, MD²; Siwadon Pitukweerakul, MD³; Attasit Chochechanachaisakul, MD⁴; Aneesa A. Shetty, MD, MPH⁵; Pritika Shrivastava, MD¹; Dilip Samarapungavan, MD, MRCP, FASN¹; Opas Traitanon, MD⁶; Maria Lourdes Gonzalez Suarez, MD, PhD⁷; Lorenzo Gallon, MD⁵

¹Multi-Organ Transplant Center, Division of Nephrology, Department of Internal Medicine, Oakland University William Beaumont School of Medicine, Royal Oak, Michigan; ²Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand 10700; ³Department of Internal Medicine, Presence St. Francis Hospital, Evanston, Illinois; ⁴Comprehensive Transplant Center, Division of Organ Transplantation, Department of Surgery, Northwestern University Feinberg School of Medicine, Chicago, Illinois; ⁵Comprehensive Transplant Center, Division of Nephrology and Hypertension, Department of Medicine, Northwestern University Feinberg School of Medicine; ⁶Department of Medicine-Nephrology, Thammasart University Hospital; ⁷Division of Nephrology and Hypertension, Mayo Clinic, Rochester, Minnesota

INTRODUCTION

- The efficacy of renal artery angioplasty ±stenting for blood pressure (BP) control in transplant renal artery stenosis (TRAS) is unknown. We aim to identify this outcome after this procedure.
- We aim to identify this outcome after this procedure.

MATERIALS & METHODS

- From all 1,905 kidney transplantations performed between 2008 and 2015 at our institute, 19 patients was diagnosed with TRAS by angiography and each of these 19 patients was individually matched to 2 subjects without TRAS based on age, gender, diabetes, and year of kidney transplantation.

RESULTS

- Mean age was 50.29±3.51 years old and 36.84% had diabetes. The majority of patients were Caucasian (37%) and African American (32%), and 84% were male.
- At the time of angioplasty, SBP (157.3±4.6 vs. 138.3±3.7, p=0.003) and DBP (84.1±3.5 vs. 74.4±1.8, p=0.0074) were significantly higher in TRAS group while serum creatinine (SCr) did not differ.
- The mean duration of diagnosis for TRAS was 3.31±3.41 months posttransplant (range: 0.37 to 63.23).
- SBP after angioplasty±stenting were significantly lower than pre-angiographic SBP (137.95±6.70 vs. 157.32±4.58 mmHg, p=0.0186) (Figure 1). However, DBP were not significantly different (77.42 ± 2.97 vs. 84.11±3.49 mmHg, p=0.0605) and same as SCr (1.68±0.15 and 2.36±0.61 mg/dL, p=0.6800) (Figure 2).
- Mean duration of follow-up from the time when TRAS was diagnosed to the most recent follow-up was 2.09±0.43 years (range: 0.02 to 6.34).
- There was no improvement in SBP, DBP, and SCr at the time of the most recent follow-up visit compared to those at pre-angioplasty.
- Only 1 patient (5%) had arterial dissection during the procedure.

Table 1: Characteristics and some results of transplant renal artery stenosis and matched control groups.

N/A, not applicable

	TRAS	Control	P value
N	19	38	
Age	50.29±3.51	50.54±2.48	0.9538
Gender			
- Male	16	32	1
Race			
- Caucasian	7	26	0.0449
- African American	6	4	0.0685
- Asian	1	0	0.3333
- Other	5	8	0.7419
Mean duration of diagnosis of TRAS	3.31±3.41 months (range: 0.37 to 63.23)	N/A	
Mean duration of follow-up from the time of diagnosis of TRAS	2.09±0.43 years (range: 0.02 to 6.34)	N/A	
Blood pressure at the time of angioplasty (TRAS) or at the same post-transplant period as their corresponding cases (control)			
- Systolic blood pressure	157.3±4.6	138.3±3.7	0.003
- Diastolic blood pressure	84.1±3.5	74.4±1.8	0.0074
Complication			
- arterial dissection	1 (5%)	N/A	

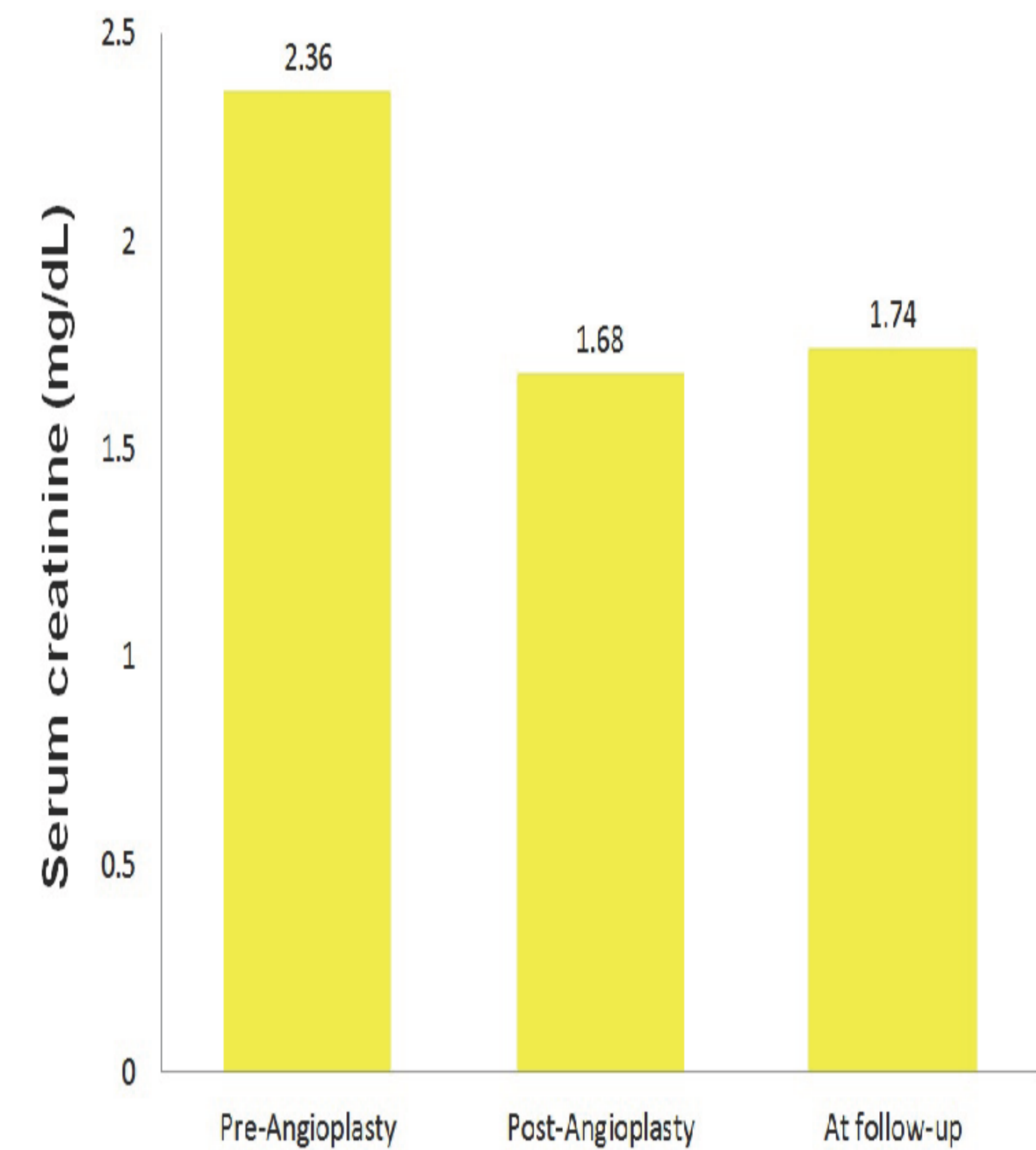


Figure 2: Serum creatinine before and after renal artery balloon angioplasty ± renal artery stenting as well as at the most recent follow-up visit.

CONCLUSIONS

- Even though lowering short-term BP, renal artery angioplasty±stenting may not control BP in the long-term follow-up.

REFERENCES

- Suthanthiran M, Strom TB. Renal transplantation. N Engl J Med. 1994 Aug 11;331(6):365-76.
- Hariharan S, Johnson CP, Bresnahan BA, Taranto SE, McIntosh MJ, Stablein D. Improved graft survival after renal transplantation in the United States, 1988 to 1996. N Engl J Med. 2000 Mar 2;342(9):605-12.
- Meier-Kriesche HU, Schold JD, Srinivas TR, Kaplan B. Lack of improvement in renal allograft survival despite a marked decrease in acute rejection rates over the most recent era. Am J Transplant. 2004 Mar;4(3):378-83.
- US Renal Data System. USRDS 2008 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Bethesda, MD 2008.
- Ojo AO. Cardiovascular complications after renal transplantation and their prevention. Transplantation. 2006 Sep 15;82(5):603-11.
- Kasiske BL. Risk factors for accelerated atherosclerosis in renal transplant recipients. Am J Med. 1988 Jun;84(6):985-92.
- Fervenza FC, Lafayette RA, Alfrey EJ, Petersen J. Renal artery stenosis in kidney transplants. Am J Kidney Dis 31: 142-148,1998
- Smellie WA, Vinik M, Hume DM. Angiographic investigation of hypertension complicating human renal transplantation. Surg Gynecol Obstet 128: 963-968, 1969
- Bruno S, Remuzzi G, Ruggenenti P. Transplant renal artery stenosis. J Am Soc Nephrol. 2004 Jan;15(1):134-41.
- Luke RG, Curtis J. Biology and treatment of transplant hypertension. In: Hypertension Pathophysiology, Diagnosis and Management, edited by Laragh JH, Brenner BM, New York, Raven Press, 1995, pp 2471-2483.

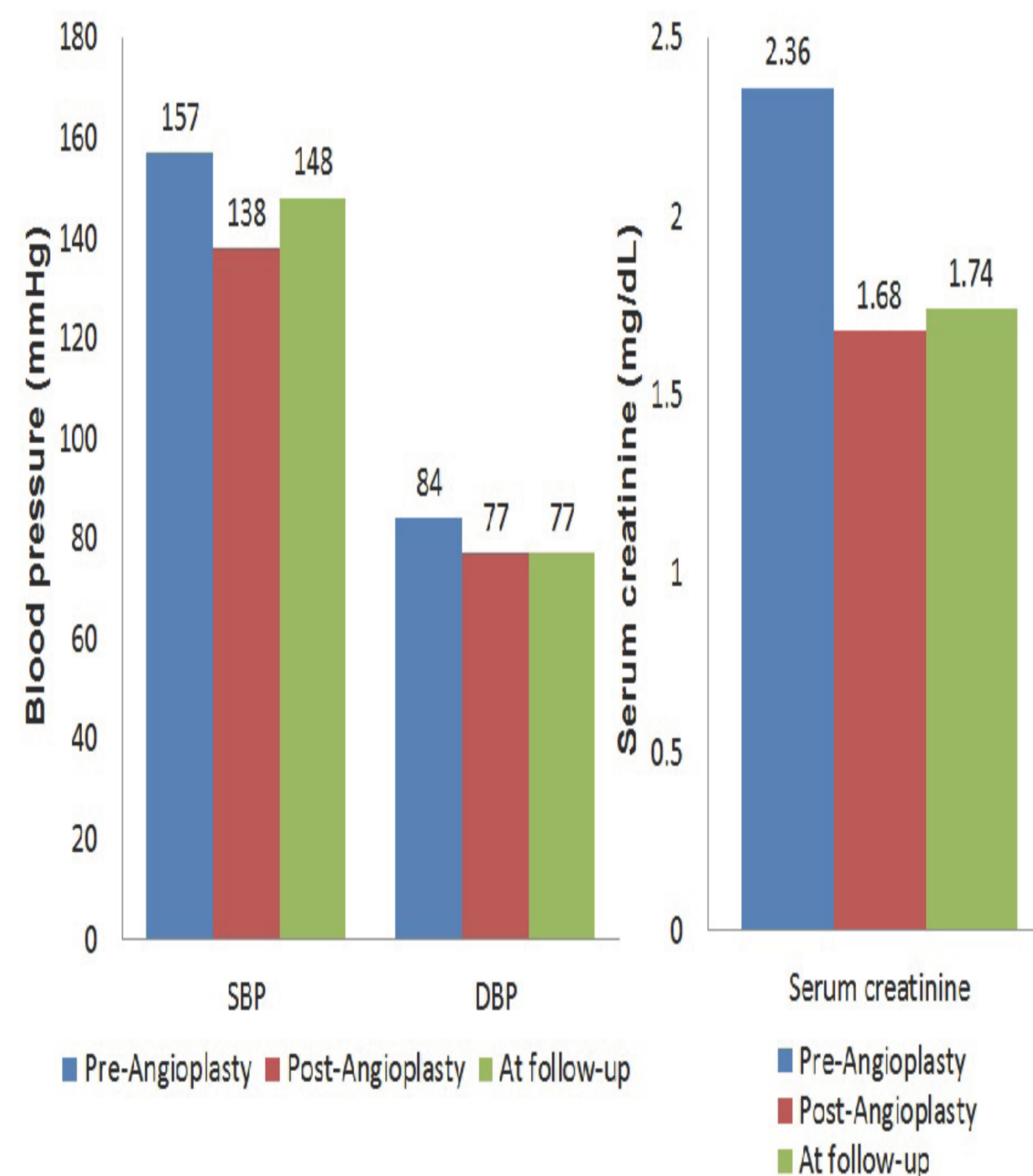


Figure 1: Systolic and diastolic blood pressure, serum creatinine before and after renal artery balloon angioplasty ± renal artery stenting as well as at the most recent follow-up visit.

ACKNOWLEDGEMENT

- The authors would like to thank Anna Pawlowski and Eric Stanczyk from Northwestern Medicine Enterprise Data Warehouse (NMEDW), Northwestern University Feinberg School of Medicine and Charity Chen from the Department of Biostatistics, Research Institute, William Beaumont Hospital for data search.
- We also appreciate grant support from Northwestern Medicine Enterprise Data Warehouse (NMEDW) Pilot Data Program, Northwestern University Feinberg School of Medicine.

CONTACT INFORMATION

Ekamol Tantisattamo, MD, FACP, FASN, FNKF
 etantisattamo@oakland.edu

