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Management of transplant renal artery stenosis: A Case Series

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Abstract
Background
The incidence of renal artery stenosis after transplant varies from 1% to 23 % and it has become an important curable cause of hypertension, graft dysfunction and graft loss in kidney recipients. We reported three cases of transplant renal artery stenosis which required interventions.
Materials and methods
Between January 2012 and December 2016, three patients required interventions for renal artery stenosis (RAS) following live related renal transplant in Department of Urology in Christian Medical College, Vellore. Clinical manifestations, diagnosis and outcomes were analyzed retrospectively.
Results and observations
All three patients were male and mean age at the time of interventions was 31.3 years(21 to 44 years). Native kidney disease was unknown for two patients and one had diabetic nephropathy. Renal artery and external iliac artery anastomosis was done in two patients and anastomosis with internal iliac artery was done in one patient. One had uncontrolled hypertension requiring four antihypertensives. One had gradual rise in creatinine and the third patient was intervened for progressively worsened image documented stenosis. The mean time to intervention was 6.7 months (3 to 9 months).All were managed with angioplasty and there were symptomatic improvement and stable graft functions after interventions.
Conclusion
Renal artery stenosis following renal transplant is a curable cause of uncontrolled hypertension and deterioration of graft function. Diagnosis and adequate intervention is required for symptoms regression and restoration of graft function.

Keyword – *Renal artery stenosis, transplant, angioplasty, hypertension, angiogram.*

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I. Introduction

The incidence of renal artery stenosis varies from 1% to 23 % [1] and it has become an important curable cause of hypertension, graft dysfunction and graft loss in kidney recipients. Doppler evaluation has been used worldwide as a screening tool for the diagnosis of RAS. Increasing use of Doppler ultrasound (DUS) and magnetic resonance angiography has led to an increased rate of detection of asymptomatic RAS[2]. Early detection and appropriate treatment is required to improve patient and graft survival.

II. Materials and methods

Between January 2012 and December 2016, three patients required interventions for renal artery stenosis (RAS) following live related renal transplant in Department of Urology in Christian Medical College, Vellore. Clinical manifestations, diagnosis and outcomes were analyzed retrospectively.

III. Results and observations

All three patients were male and mean age at the time of interventions was 31.3 years (21 to 44 years). Native kidney disease was unknown for two patients and one had diabetic nephropathy. Renal artery and external iliac artery anastomosis was done in two patients and anastomosis with internal iliac artery was done in one patient. One had uncontrolled hypertension requiring four antihypertensives. One had gradual rise in creatinine and the third patient was intervened for progressively worsened image documented stenosis. The mean time to intervention was 6.7 months (3 to 9 months).All were managed with angioplasty and there were symptomatic improvement and stable graft functions after interventions.

Case 1

21 years male had undergone live related renal transplant for unknown native kidney disease. Renal artery was anastomosed with internal iliac artery. Post operatively he developed accelerated hypertension and pulmonary edema requiring four antihypertensives. Doppler studies postoperatively showed the presence of transplant renal artery stenosis(>70%)with high turbulence across the anastomosis (Peak systolic velocity of 350-400 cm/sec) and intrarenal parvus et tardus spectral pattern. His creatinine levels plateaued at 1.4 to 1.5 mg/dl. MR angiogram confirmed focal narrowing at the site of anastomosis of graft renal artery to right internal iliac artery. Angioplasty and stenting was performed after 3 months of renal transplant (Figure 1). After intervention his blood pressure stabilized and graft function has improved (mean nadir creatinine of 1.10 mg/dl)

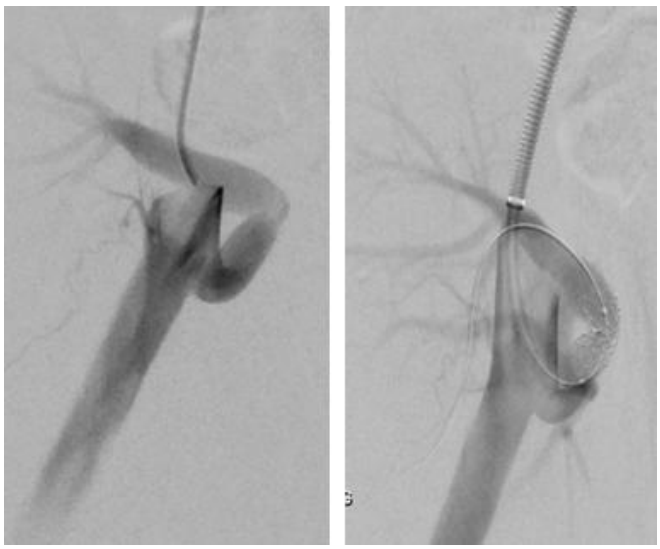

Figure 1: Angiogram showing stenosis and post stenting

Case 2

44 years male underwent renal transplant for native kidney disease of diabetic nephropathy. Main renal artery was anastomosed with external iliac artery and accessory renal artery was anastomosed with inferior epigastric artery. Postoperative Doppler showed high turbulent flow across the anastomosis in external iliac artery with peak systolic velocity(PSV) of 350-430 cm/sec which was progressively worsening in further imaging. MR angiogram confirmed focal narrowing at the site of anastomosis of graft renal artery to external iliac artery. Balloon angioplasty with stenting was performed after 8 months of renal transplant (Figure 2). His creatinine became stabilized after angioplasty.

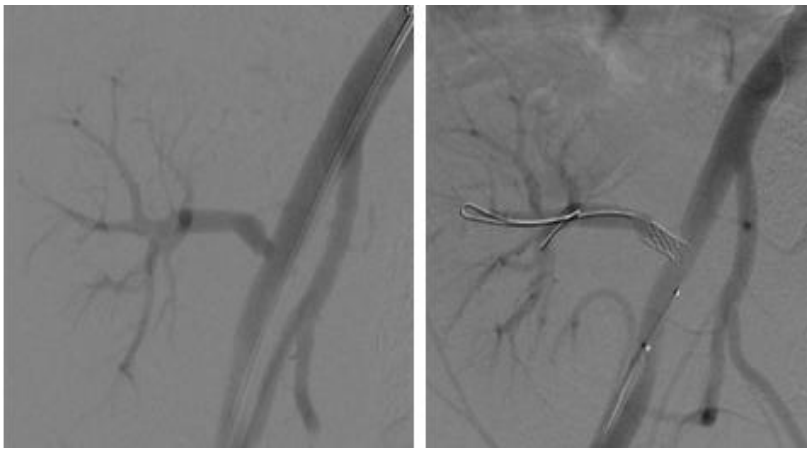

Figure 2: Angiogram showing stenosis and post stenting

Case 3

34 years male had renal transplant for unknown native kidney. Main renal artery was anastomosed with external iliac artery. Post operatively he had persistently high creatinine (mean nadir of 1.7 mg/dl). Doppler

showed high turbulent flow across the anastomosis in external iliac artery with PSV of 250-280 cm/sec and about 60% stenosis of anastomotic site which was confirmed by angiogram. Subsequently Balloon angioplasty was performed after 9 months of renal transplant (Figure 3). His graft function has improved (mean nadir creatinine of 1.30 mg/dl)

Figure 3: Angiogram showing stenosis

IV. Discussion

Renal artery stenosis is one of the major vascular complications of renal transplantation, which usually presents with uncontrolled hypertension or unexplained renal dysfunction. Hypertension following renal transplantation can be multifactorial including chronic rejection, cyclosporine toxicity, use of corticosteroids, recurrent glomerulonephritis, native kidney disease or RAS[3]. It usually occurs between 3 months and 2 years after renal transplantation, with the highest frequency in the first 6-month post-transplant but it may present at any time[4,5]. Most common cause of renal artery stenosis is technical failure and it is located in the line of anastomosis. Doppler ultrasound is a well-accepted screening tool for assessment of renal vasculature is highly sensitive and specific[6]. It is used as a guide for close monitoring or further evaluation including angiogram. PSV, intra-renal dampening of flow and resistive index are the important diagnostic parameters. Baxter et al. suggested a PSV of more than 250 cm/s to make a diagnosis of RAS[7]. An isolated finding of high PSV in renal Doppler recommends a close follow-up, but does not necessarily warrant further intervention unless the other associated features are also present[3]. The degree of stenosis is considered significant when more than 50% of the arterial lumen is involved. Intervention is required when blood pressure is not controllable by medication or there is progressive worsening of renal function[8]. Here we presented three case of renal artery stenosis who required interventions either for uncontrolled hypertension and gradual rise in creatinine or progressively worsened image documented stenosis. All had stable graft functions after interventions.

V. Conclusion

Renal artery stenosis following renal transplant is a curable cause of uncontrolled hypertension and deterioration of graft function. Diagnosis and adequate intervention is required for symptoms regression and restoration of graft function.

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