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Case Report

Imaging and endovascular management in allograft renal artery stenosis: Case report

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ABSTRACT

Transplant renal artery stenosis (TRAS) is a relatively frequent, potentially curable cause of refractory hypertension and allograft dysfunction and usually becomes apparent between 2 months and 2 years after renal transplantation. Depending on the hemodynamic significance of stenosis it can be treated conservatively or by revascularization. Here we describe a case of TRAS which was treated successfully with angioplasty with a brief review of its etiology, natural history, diagnosis and therapy.

1. Introduction

Renal artery stenosis is one of the commonest vascular complication that causes premature graft loss and death of the patient.[1] A higher incidence of renal artery stenosis is seen in cadaveric transplants (13.2–17.7%) compared with live donors (1.3–5.8%).[2] The usual interval between transplantation and diagnosis of transplant renal artery stenosis ranges from 2 to 45 months.[3] Its incidence varies widely between 1 and 23% depending on the diagnostic techniques used.[4] The commonest cause of stenosis is due to the surgical techniques and the stenosis is usually located at the anastomosis. The other causes, which are associated with stenosis, are vascular damage during preservation or due to vascular clamps and torsion, kinking or angulation of the artery. Stenosis can also occur due to donor or recipient atherosclerosis or rarely due to immunological injury.

2. Case report

A 34-year-old male patient with chronic renal failure underwent live related renal transplantation from his mother as donor in August 2013. The single renal artery of the donor was

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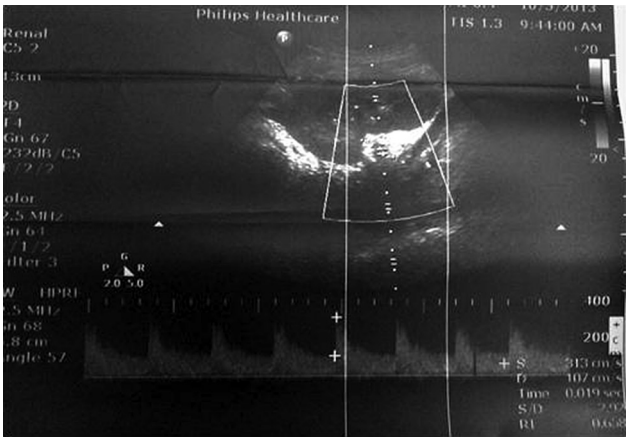

Fig. 1 – Doppler USG revealed narrowing of the renal artery with a maximum PSV of 320 cm/s at the site of narrowing.

anastomosed end-to-end with the recipient internal iliac artery. Renal vein was anastomosed with recipient internal iliac vein in an end-to-side manner and a uretero-neocystostomy was created. There were no immediate graft related complications and the patient had an uneventful hospital stay. The baseline serum creatinine after the transplantation was 1.3 mg/dl. Patient was kept in close follow-up with periodic serum creatinine measurements.

Two months after the transplant surgery, a rise in patient's serum creatinine (2.1 mg/dl) was noticed along with raised blood pressure (180/90 mm Hg). Thereafter, the patient was advised radiological evaluation in view of clinical suspicion of renal artery stenosis.

Color Doppler examination revealed narrowing of the renal artery just distal to the site of anastomosis with a maximum Peak Systolic Velocity (PSV) of 310 cm/s at the site of narrowing (Fig. 1).

To further delineate the extent of narrowing, MR angiography was advised instead of CT angiography in view of the compromised renal function and the precious kidney. Contrast enhanced MR angiography showed significant narrowing (>90%) within the main renal artery just distal to the site of anastomosis. There was another focus of narrowing in the proximal part of the lower pole segmental renal artery (Fig. 2).

Patient was then referred for endovascular management. Diagnostic selective angiography of the transplant renal artery with an ipsilateral transfemoral approach showed narrowing of the main renal artery (60%) and mild narrowing of the segmental artery to lower pole (Fig. 3).

With the same approach a guidewire was advanced across the stenotic segment and transarterial balloon angioplasty was done by serial balloon dilatation with maximum balloon size (5 × 20). Stenting was avoided to salvage a stenosed segmental branch as stenting would have further compromised flow through this vessel. There was reduction in pressure gradient of the order of 30 mm Hg across the stenosed segment when measured post procedure as compared pre procedure (Fig. 4).

Post procedure follow-up serum creatinine after 6 weeks showed improved renal function manifested by reduction in creatinine values (1.5 mg/dl). The blood pressure also reverted to normal (130/80 mm Hg) without any antihypertensive medications. Follow-up Doppler evaluation revealed normalization of the spectral waveform and PSV of the previously affected vessel.

3. Discussion

Due to development of powerful immunosuppressive therapies, there has been a relative increase in the contribution of vascular complications as a cause of renal transplant failure as compared to the transplant rejection that had been the major cause in the past.[5]

The diagnosis of the renal artery stenosis is now screened with the Doppler sonography, the only limitation being that

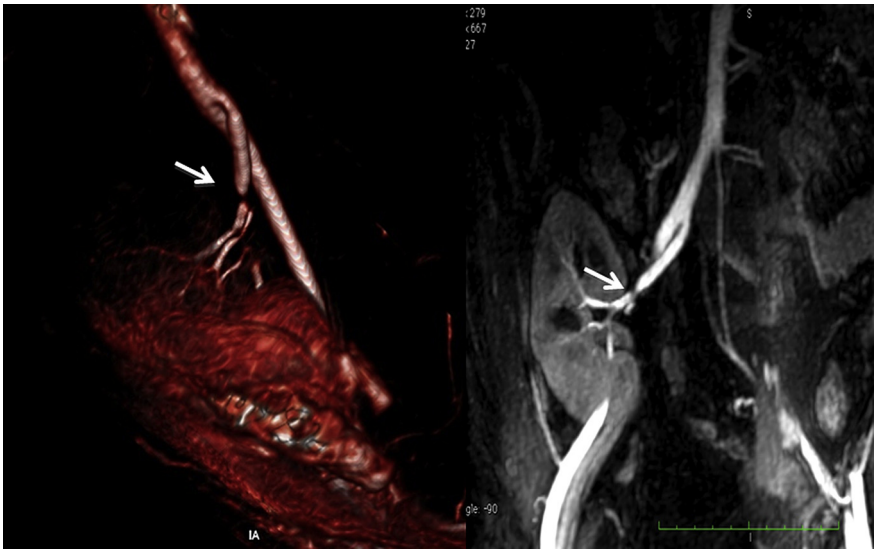

Fig. 2 – 3D volume rendered and MIPMR angiography images showing severe stenosis in the right main renal artery just distal to the site of anastomosis (white arrow).