

Case 8038

Renal allograft complicated with renal artery stenosis

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Section: Cardiovascular

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Patient: 61 year(s), male

Clinical History

A 61-year-old male with chronic renal insufficiency due to ADPKD underwent a cadaveric donor renal transplantation. On D5 post-transplantation, Doppler US revealed focal caliber reduction and aliasing of the proximal renal artery, with elevated peak-systolic velocities (370 cm/s) and disturbed distal blood flow, indicative of a significant stenosis.

Imaging Findings

A 61-year-old male patient with chronic renal insufficiency due to ADPKD, under hemodialysis since 2003, underwent a cadaveric donor left renal transplantation in 2009, the allograft being placed extraperitoneally, in the right lower quadrant. There was a single donor renal artery, which was anastomosed with the recipient's common iliac artery using an end-to-side anastomosis. A JJ stent was left across the ureteroneocystostomy, performed using the Lich-Gregoir technique. In the immediate post-transplantation period, US and Doppler US revealed no abnormalities. Still, patient was hypertensive, oliguric and was submitted to hemodialysis due to hyperkalemia ($K^+ = 6.2$ mmol/L) on D2 post-transplantation.

US and Doppler US were repeated on D5 post-transplantation, US revealing a normal-sized kidney with regular borders and preserved parenchymal thickness and echogenicity (Fig. 1). The proximal end of the JJ stent was adequately placed in the superior caliceal group and only mild dilation of the calices and pelvis was noted.

Color Doppler evaluation showed acute angulation and lumen reduction of the proximal renal artery (still, distally to the anastomosis), with aliasing due to high velocity flow (Fig. 2). Spectral analysis

revealed spectral broadening and elevated peak systolic velocities - 370 cm/s (Fig. 3). There were also distal prolonged acceleration times (Figs. 4-6). These findings were indicative of a significant stenosis, which was likely caused by kinking.

Discussion

Renal artery stenosis usually occurs in the 1st year post-transplantation and is, in 50% of cases, located at the level of the anastomosis, particularly when end-to-end anastomosis is performed. Possible causes are vessel perfusion injury, faulty suture technique or a reaction to suture material. Stenosis located proximally to the anastomosis may be due to atherosclerosis in the native vessel. Stenosis located distally may be due to graft rejection, kidney malposition and kinking or extrinsic compression of the renal artery. An immediate stenosis from kinking is more likely to occur with a right renal allograft, in which the artery is longer than the vein.

In graft recipient follow-up, a search for a renal artery stenosis should be performed if the patient presents with severe hypertension, refractory to medical therapy; hypertension and an audible bruit over the graft or hypertension associated with unexplained graft dysfunction.

At Color Doppler US, renal artery stenosis presents as areas of lumen reduction with colour aliasing due to increased flow velocity. Spectral analysis criteria for significant stenosis are:

- . Focal frequency shifts greater than 7.5 KHz (when a 3 MHz transducer is used)
- . Local velocities greater than 2 m/sec
- . Velocity gradients between stenotic and pre-stenotic segments of more than 2
- . Spectral broadening
- . A tardus-parvus spectral waveform in the renal parenchymal arteries

Treatment of graft renal artery stenosis is performed primarily with percutaneous transluminal angioplasty, with or without stent placement, with success rates as high as 73%. Surgical correction, though, is the preferred method for treatment of kinking of the proximal transplant renal artery.

Final Diagnosis

Renal artery stenosis

Figures

Figure 1 Figure 1





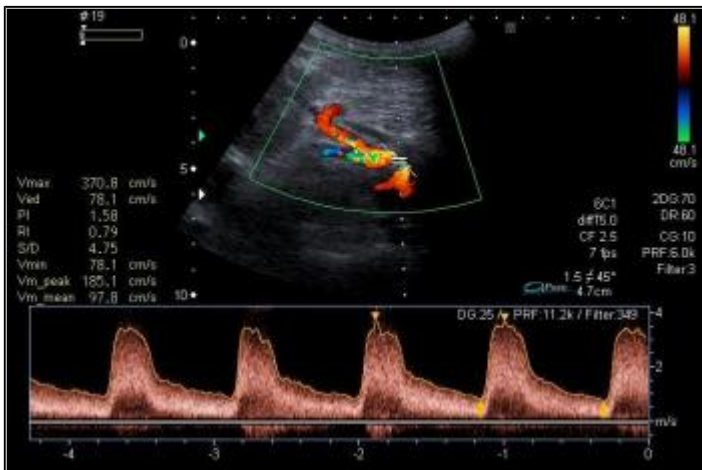
US evaluation of the renal allograft showed only mild dilation of the renal calices and pelvis.

Figure 2



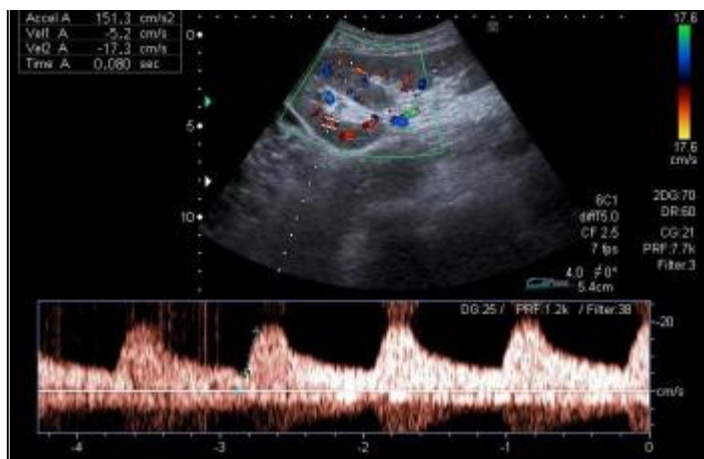
Color Doppler evaluation showed acute angulation and caliper reduction of the proximal renal artery. Aliasing was noted due to high velocity flow.

Figure 3



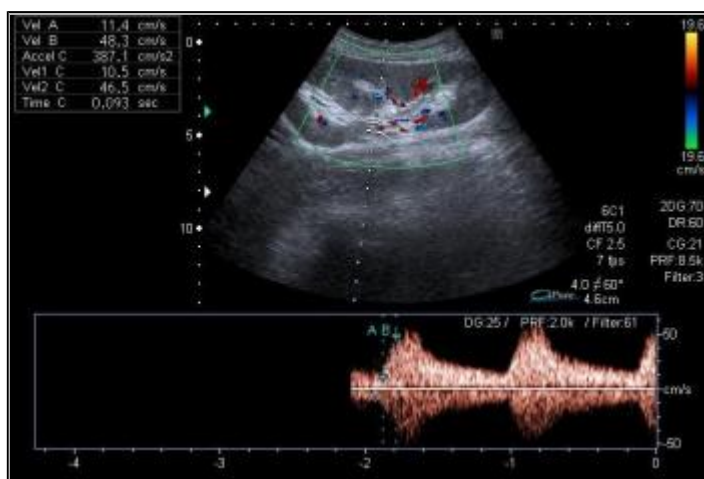
Spectral analysis showed spectral broadening and locally elevated peak systolic velocities - 370 cm/s.

Figure 4



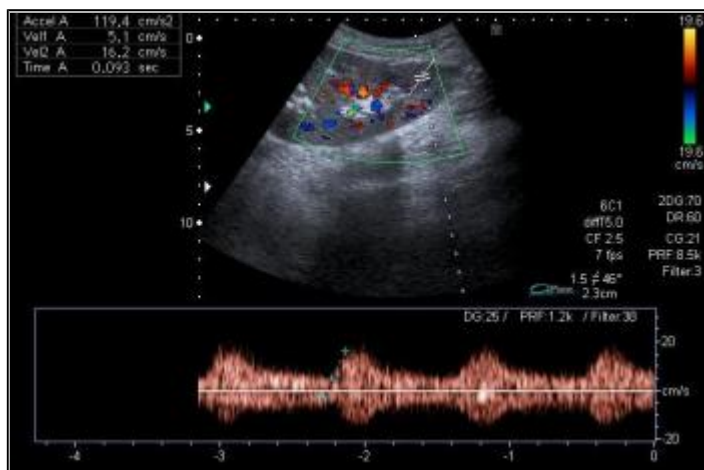
There were distal prolonged systolic acceleration times, indicative of a significant stenosis.

Figure 5 Figure 5



There were distal prolonged systolic acceleration times, indicative of a significant stenosis.

Figure 6 Figure 6



There were distal prolonged systolic acceleration times, indicative of a significant stenosis.

Renal Artery Obstruction [C12.777.419.775]

Narrowing or occlusion of the renal arteries. It is due usually to atherosclerosis, fibromuscular dysplasia, thrombosis, embolism, or external pressure. It may result in renovascular hypertension.

References

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Citation

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