Arteriovenous Fistula and Renal Artery Stenosis in a Transplant Kidney

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Dear Sir,

Transplant kidney artery stenosis and arteriovenous fistula are recognized vascular complications in kidney transplantation [1]. We report an interesting patient with a combination of renal artery stenosis and arteriovenous fistula in the transplant kidney. A 43-year-old woman with end-stage renal disease caused by chronic glomerulo-nephritis underwent cadaveric renal transplantation. The donor kidney had a single artery and the surgical procedure was uncomplicated. The transplant kidney functioned well and produced 1,500 ml of urine on the first postoperative day. Immunosuppression comprised of prednisolone, azathioprine and cyclosporine A. Routine posttransplant radio-isotope DTPA and ultrasound scans of the transplant kidney were normal. At 2 weeks posttransplant, the patient was discharged with a serum creatinine of $90 \mu\text{mol/l}$. Her blood pressure was 140/90 mm Hg with the use of nifedipine 20 mg 3 times a day. No renal bruit was audible. Three months posttransplant, her serum creatinine rose abruptly to $181 \mu\text{mol/l}$ though serum cyclosporine levels were within therapeutic values. A kidney biopsy at the lower pole was performed, using ultrasound localization, which showed evidence of acute cellular rejection. She received three doses of intravenous methylprednisolone and the serum creatinine returned to $140 \mu\text{mol/l}$.

Three months after her treatment for acute allograft rejection, her serum creatinine gradually rose to $234 \mu\text{mol/l}$. Her blood pressure was 210/120 mm Hg and a soft systolic bruit was heard over the transplant kidney. Intra-arterial digital subtraction arteriography (DSA) of the transplant kidney confirmed the presence of a tight renal artery stenosis which was greater than 75%, proximal to the bifurcation of the renal artery. In addition, a column of contrast was seen arising near the lower pole of the kidney, suggesting the presence of an arteriovenous shunt (fig. 1a). The stenosis was treated using percutaneous angioplasty and balloon dilatation, postangioplasty, her serum creatinine progressively rose over 3 weeks to $711 \mu\text{mol/l}$. Her blood pressure was 150/90 mm Hg and a louder bruit was now audible over the transplant kidney (fig. 2).

A repeat DSA showed prominent shunting of blood, arising near the lower pole of the kidney, and early filling of the venous system. The lumen of the transplant renal artery showed good caliber at the site of previous stenosis (fig. 1b). The presence of a large arteriovenous fistula was shunting a large amount of blood and causing deterioration of renal function. Attempted

embolization of the fistula was unsuccessful and surgical repair was attempted. Unfortunately, this failed and the allograft kidney was lost. Pathologic examination showed the presence of minor residual renal artery stenosis and a large deep parenchymal fistula, connecting a large renal vein and artery. A small thrombus was seen in the renal vein adjacent to the site of anastomosis, presumably a result of turbulent blood flow. No evidence of acute or chronic rejection was seen. The fistula was felt to be caused by the biopsy. The incidence of arteriovenous fistulae of the transplant kidney after a biopsy, diagnosed by duplex and color flow sonography, had been reported as 7.7% [2]. Although most fistulae are usually small, clinically unproble-

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Fig. 1. Intra-arterial DSA of the transplant kidney showing a tight stenosis proximal to the bifurcation of the renal artery, and an arteriovenous shunt arising near the lower pole of the kidney (a); successful dilatation of the arterial stenosis resulted in marked increase in the shunting with early filling of the venous system (b).

matic, and resolve spontaneously, some enlarge and may result in uncontrollable hypertension, deteriorating renal function and hemorrhage. Large fistulae are usually centrally located and involve larger arteries and veins. These may require embolization or surgical

repair [3]. Progressive allograft dysfunction secondary to a large fistula is rare and only two previous cases had been reported [4, 5].

In summary, we present an unusual patient with a concomitant renal artery stenosis and an arteriovenous fistula, the correction of the stenosis led to a marked increase in blood flow, rapid enlargement of the fistula and increased shunting of blood, to produce a functional state similar to an ischemic 'Goldblatt' kidney, causing progressive allograft dysfunction.

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Fig. 2. Change in serum creatinine levels with time: 90 $\mu\text{mol/l}$ 2 weeks posttransplant (thin arrow), 181 $\mu\text{mol/l}$ acute allograft rejection (short bold arrow), 234 $\mu\text{mol/l}$ renal artery stenosis (open head arrow), and 711 $\mu\text{mol/l}$ large arteriovenous shunt (long bold arrow).

i

1000

800-

600-

400

200

-2

Time, months

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Vascular Complications in a Transplant Kidney