The Interesting Case

Treatment of primary graft dysfunction after kidney transplantation by renal artery stent

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Introduction

Renal artery stenosis is a rare cause of primary graft failure after kidney transplantation [1]. Percutaneous transluminal angioplasty (PTA) is the treatment of choice, however, this technique has its limitations in elastic stenoses that are resistant to dilatation [2,3]. The procedure is of high risk, especially in the early phase after transplantation. If renal artery stenosis is refractory to PTA, the placement of an endovascular prosthesis (Palmaz stent) may be necessary. To our knowledge there are no reports in the literature regarding transplant renal artery stenting in the early period after transplantation.

Case report

A 29-year-old man was admitted to our hospital with oliguria, uraemia and hypertension (180/120 mmHg) 3 weeks after a live-donor kidney transplantation in Bombay, India. The patient's record revealed that after initial diuresis of 1700 ml/day, he became oliguric and dialysis was required on the 4th postoperative day. At that time, renal biopsy demonstrated mild cellular rejection. Antithymocyte globulin was administered for 5 days without improvement of kidney function. On the 20th postoperative day the patient was discharged with a non-functioning graft.

On admission to our hospital, at day 22 after transplantation, physical examination showed a uraemic, fluid-overloaded, oliguric patient with a bruit around the graft. Serum creatinine was 760.2 μmol/l and urea nitrogen 46.5 mmol/l, and therefore haemodialysis was started. Colour Doppler sonography (CDS) revealed a high-grade transplant renal artery stenosis in the region of the end-to-end anastomosis to the internal iliac artery (Figure 1a). Renal biopsy ruled out rejection and other parenchymal disorders. Arterial angiography confirmed the CDS diagnosis and angioplasty was performed using a 5-mm dilation balloon (Figure 2a). However, due to elastic recoil, there was not much improvement angiographically and kidney function and blood pressure did not substantially improve. To overcome the remaining high-grade stenosis, an intravascular endoprosthesis (Palmaz stent, 10 mm in length, dilated up to 5 mm) was successfully implanted into the stenotic region (Figure 2b). Immediately thereafter, diuresis increased (3000 ml/day), serum creatinine level dropped to 141.4 μmol/l, and blood pressure improved. Control CDS confirmed that the endoprosthesis was correctly placed with a slight narrowing at the suture, but no turbulences were detected (Figure 1b). Three months postoperatively, the patient had stable renal function with a serum creatinine of 123.7 μmol/l.

Comment

Acute rejection and cyclosporin toxicity represent the main causes of early graft failure following kidney transplantation [4]. In our patient graft failure was due to high-grade renal artery stenosis at the end-to-end anastomosis of the internal iliac with the transplant artery. The transplant artery was extremely short and the stenosis was located so close to the hilum of the grafted kidney, that surgical treatment would have been associated with very high risk. Therefore balloon angioplasty appeared to be the treatment of choice to restore graft function. This procedure failed due to the elastic nature of the stenosis. It has been suggested that indications for renal stent implantation are ostial artery stenoses refractory to angioplasty, and there are a few preliminary reports of patients treated for renovascular hypertension by use of different stent devices [5-7]. Moreover, four patients treated with endovascular prostheses for transplant renal artery stenosis have been described so far in the literature. At follow up, stent placement with a functioning graft was successful in two of these four patients [7-9]. In our patient, angioplasty combined with stent placement was the
Fig. 1a. Colour Doppler sonography of the transplant renal artery illustrates the high-grade stenosis. The yellow and blue colours are a result of high systolic velocities (5.17 m/s) and turbulences in the area of the stenosis. 

Fig. 1b. Postangiographic examination revealed normal flow velocities without aliasing of the colour; however, the stent (white arrows) is slightly narrowed due to scar tissue at the end-to-end anastomosis.

Fig. 2a. Selective arteriography reveals the high-grade stenosis at the end-to-end anastomosis of the internal iliac and renal artery with hypoperfusion of the graft.

Fig. 2b. Control angiography after stenting demonstrates successful placement of the stent with only a slight narrowing of the vessel and no relevant stenosis.
first-line treatment because of the location of the stenosis close to the hilum, and this resulted in a favourable outcome.

References


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