Case Report

Restoration of renal allograft function by endovascular stenting of an iliac artery dissection

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Introduction

Dissection of the external iliac artery is a very rare complication following transplantation of a renal allograft. Two cases have been described by Merkus et al. [1], which were related to previous trauma. Esteban et al. [2] reported non-traumatic dissection of the external iliac artery in a patient, which was successfully treated by Strecker stent insertion. In a series of 90 living related kidney transplants, Palestini and co-workers described one patient with an iliac artery dissection out of 90 consecutive living related kidney recipients [3]. We report a case of very early external iliac artery dissection causing acute loss of allograft perfusion. Allograft perfusion was restored by intravascular Perflex stent insertion.

Case

A 59-year-old man with end-stage renal failure due to interstitial nephropathy underwent cadaveric renal transplantation in March 2001. The patient had type 2 diabetes and arterial hypertension since 1985. The patient underwent coronary angioplasty in 1997 and 1998. In July 2000, a stenosis of the left superficial femoral artery was diagnosed and successfully treated with balloon angioplasty. The left common iliac artery was normal on angiography, whereas several plaques were found on the right side. The donor was a 57-year-old man who died from traumatic head injury and developed acute renal failure with an increase in serum creatinine from 0.64 to 3.84 mg/dl within 2 days. A renal biopsy specimen obtained prior to transplantation showed acute tubular necrosis but no other pathologic findings.

The right kidney was transplanted; a patch of the single donor renal artery was anastomosed to the left external iliac artery, which appeared normal during surgery. Cold ischaemia time was 16 h, and warm ischaemia time was 22 min. The immunosuppressive regimen included prednisolone, cyclosporin A, and sirolimus. In the postoperative period, daily Doppler sonography exhibited a normally perfused graft. However, the patient remained oliguric. On the fourth postoperative day, an almost complete loss of perfusion was detected by Doppler sonography and was confirmed by contrast-enhanced computed tomography. In an immediate surgical examination, the graft appeared well-perfused, and graft nephrectomy was not performed. Acute tubular necrosis was diagnosed in a second biopsy specimen obtained during surgery.

One day after the second operation, re-evaluation by Doppler sonography again showed complete loss of graft perfusion. A systolic and diastolic bruit was heard over the left femoral artery and the graft itself. Angiography was performed via the contralateral femoral artery displaying dissection of the left external iliac artery with an intimal flap occluding the ostium of the renal graft artery (Figure 1). To prevent further dissection with ischaemic damage of the patient’s left leg, a 7.55 mm balloon-expandable vascular stent (Perflex®, Cordis Endovascular Corp, Salt Lake City, UT, USA) was inserted via an additional ipsilateral vascular access [4]. After balloon inflation, the intimal flap was pushed away from the renal artery ostium re-establishing perfusion of the graft (Figure 2). Combination treatment with clopidogrel and aspirin was started.

Twelve hours after the intervention, urinary excretion started with a diuresis of 500 ml/24 h. Lactate dehydrogenase concentration decreased from 1131 to 609 U/l within 3 days. Six days after intervention,
diuresis was 1350 ml/day and further haemodialysis treatment was no longer necessary. Serum creatinine concentration decreased to 2.0 mg/dl and the patient was discharged on the 27th day after kidney transplantation. Renal function remained stable during the 3-month follow-up.

Discussion

Spontaneous iliac artery dissection has been reported in patients with atherosclerosis [5]. However, most cases of iliac artery dissection are related to trauma such as surgery [6,7]. Rupture and vascular occlusion are the principal hazards. In human kidney and pancreas transplantation, dissection of the external iliac artery might also be hazardous for the allograft whose principal artery is anastomosed to the external iliac artery [1–3,8,9]. Atherosclerosis of the recipient and operative trauma such as clamping of the artery during anastomosis can lead to early graft loss [8] and acute or chronic graft failure due to vascular lesions [2]. In case of serious symptoms, treatment consists of bypass surgery [9] or endovascular stent insertion [2].

Despite normal graft perfusion, our patient was still dependent on haemodialysis because of biopsy-proven acute tubular necrosis in the transplanted kidney. In such cases, daily Doppler sonography may detect additional causes of graft failure that otherwise remain undetected. A complete loss of perfusion with kidney infarction would lead to graft explantation and, therefore, has to be confirmed by another diagnostic procedure such as computed tomography or renal transplant scintigraphy. We used computed tomography for a practical reason, as at this day radionuclide scanning was not available without further delay. In rare cases restoration of blood flow can rescue the kidney graft. As the graft in our patient appeared normally perfused during surgical exploration and no kinking of the renal artery was detectable, we believe that an intimal flap from the dissected external iliac artery functionally occluded the allograft renal artery. But this intimal flap also allowed an intermittent perfusion of the graft thereby preventing tissue necrosis.

Our patient had atherosclerosis and had already underwent angioplasty of the left femoral artery. Most probably, acute external iliac artery dissection has already occurred during transplantation when the artery was clamped for anastomosis [8]. This is the first report in the literature of a case in which an endovascular prosthesis was placed over the ostium of an allograft artery and thereby restored blood flow to the allograft and, thus, renal function.

The successful treatment of a vascular complication by an invasive approach indicates the necessity of early angiography to identify the exact vascular problem. Retrospectively, after confirmation of the loss of perfusion, we could have performed angiography before the surgical evaluation. This second operation might have been prevented with such an approach.

In accordance with the guidelines for prevention of re-occlusion after stent insertion in the coronary vasculature [10], the patient received a combination therapy with clopidogrel and aspirin for 3 months followed by aspirin alone. We regret that the patient died from severe sepsis due to pneumonia 3 months after transplantation with the graft still normally perfused.
References


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