CASE REPORT

External iliac artery dissection causing early renal transplant dysfunction

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SUMMARY

External iliac artery dissection after kidney transplantation is a rare, catastrophic but potentially reversible complication. Treatment which may save both the transplant and the patient requires clinical suspicion, timely imaging, and prompt intervention. This case report describes successful diagnosis of this complication and surgical intervention which saved the kidney and safeguarded blood supply to the patient's leg.

BACKGROUND

External iliac artery dissection after kidney transplantation is very rare. Nine cases have been presented in the literature since 1991. Diagnosed early it is potentially reversible, but left untreated it can compromise perfusion of both leg and transplanted kidney. Early diagnosis requires a high index of suspicion and appropriate imaging. This case report aims to highlight the importance of early imaging in renal transplant dysfunction and describes one technique of salvaging the graft in this rare situation.

CASE PRESENTATION

A 38-year-old patient with hypertension receiving haemodialysis for end stage renal failure secondary to ciclosporin A nephropathy after liver transplantation underwent a donation after circulatory death (DCD) renal transplant from a 40-year-old male donor. The kidney, with caval tube extension and Carrel patch, was implanted with end-to-side anastomoses to healthy external iliac vessels. The anastomosis time was 25 min, and a soft bulldog clamp was used on the proximal external iliac artery. Urine was produced immediately on clamp release. Induction immunosuppression was with basiliximab and methylprednisolone, and maintenance with tacrolimus, mycophenolate and prednisolone. The patient had good initial function, with a fall in creatinine of 70 µmol/L over a 36 h period postoperatively, but then required ultrafiltration for fluid overload. Urine output fell to 10–15 mL/h post ultrafiltration, and the patient then became dependent on dialysis. On day 9, Doppler ultrasonography followed by an arteriography was performed.

INVESTIGATIONS

The ultrasound scan showed poor vascularity of the transplanted kidney, high velocity flow (300 cm/s) and intravascular filling defects indicative of transplant renal arterial stenosis with external iliac arterial thrombosis. Arteriography showed multiple filling defects (figure 1).

DIFFERENTIAL DIAGNOSIS

The provisional diagnosis was acute tubular necrosis. However, imaging was performed to identify other potential causes such as vascular thrombosis or hydronephrosis. After imaging, external iliac artery dissection with secondary thrombus was felt to be more likely than primary external iliac artery thrombosis and anastomotic stricture, given a Carrel patch was used for anastomosis.

TREATMENT

The primary lesion was deemed unsuitable for endovascular intervention. The graft was therefore re-explored. At operation the kidney was found to be viable, there was distal ureteric ischaemia and an arterial dissection extending from the origin of the external iliac artery to the Carrel patch. Any repair of the dissection would necessitate clamping the external iliac artery proximal to the anastomosis with the Carrel patch. This would have subjected the graft to an excessive period of warm ischaemia, a decision was made to explant the graft so the graft was explanted. The external iliac artery and the caval tube were divided distal to the anastomoses leaving short stumps. The kidney was taken to the back table where it was flushed with hyperosmolar citrate and underwent a second period of 2 h 26 min static cold storage. Arteriotomies were made proximal and distal to the dissection, and the

Figure 1 Arteriogram of the transplanted kidney and associated vasculature showing a tight stenosis (A) at the anastomosis of the transplant RA and the EIA. A filling defect (B) was indicative of thrombus adherent to the dissection. The dissection had propagated along the EIA and caused a further filling defect (C) with thrombus adherent to the EIA proximally. EIA, external iliac artery; IIA, internal iliac artery; RA, renal artery.

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thrombus was evacuated. The intimal flap was secured with interrupted Kunlin sutures using 6-0 prolene. The long saphenous vein was harvested and a reversed vein bypass was used to bypass the dissection. The transplant renal artery was reanastomosed to the internal iliac artery and the caval tube to the venous stump, the second anastomosis time being 20 min. The total second ischaemic time was 2 h 47 min. It was necessary to excise the ischaemic segment of the ureter and so a transplant uretero-native ureterostomy was made (figure 2).

OUTCOME AND FOLLOW-UP

The patient was discharged on dialysis on day 18, graft function resuming 20 days post reimplantation. Serum creatinine at 12 months was 82 µmol/L.

DISCUSSION

Renal artery stenosis accounts for three quarters of vascular complications post renal transplantation, followed by arterial and then venous thromboses. Arterial dissection after vascular surgery may be caused by damage from vascular clamps. Risk factors include atherosclerosis and hypertension, both of which are common in renal transplant recipients. In spite of this, external artery dissection after kidney transplantation is rare, particularly in healthy arteries such as those seen in this case. Therefore, other causes of declining graft function were considered initially. Delayed graft function is very common in DCD renal transplants, occurring in as many as 80% of patients.¹ Despite the initial fall in creatinine, the acute tubular necrosis which causes delayed graft function can evolve post-transplant. However, because of the potential for catastrophic vascular thrombosis, it is important always to confirm adequate graft perfusion before diagnosing delayed graft function. This case reiterates the importance of this.

Management of external iliac artery dissection associated with a renal allograft is difficult, as both the graft and leg are threatened. Successful management necessitates timely reperfusion of the graft and repair of the dissection, but must not put the arterial supply to the leg at risk. Opinion currently favours percutaneous angioplasty and stent placement as the first choice intervention for repair of arterial dissection.² However, this case illustrates that while percutaneous intervention might be the treatment of choice, it is not always feasible and so surgical

intervention is required. Various approaches have been described. If the dissection is recent and the thrombus fresh, an endarterectomy, thrombectomy and intimal flap repair can be performed. Russo *et al*³ reported an external iliac artery dissection after kidney transplantation on proximal clamp release but before graft perfusion which simplified management. The dissection was repaired and bypassed with a polytetrafluoroethylene graft and the renal vessels reanastomosed to the graft. The anatomical position of the dissection and the fact that it occurred after reperfusion of the kidney made this approach unsuitable in this case. Delles *et al*⁴ report an early external iliac artery dissection after kidney transplant with loss of perfusion to the graft treated with surgical insertion of an intravascular perfluo stent to displace and fix the intimal flap away from the ostium of the renal artery. Merkus *et al*⁵ present two cases of external artery dissection after kidney transplant, one of which caused partial ischaemia of graft and leg and was managed expectantly, the other necessitated insertion of a Dacron interposition graft between the iliac and the renal artery.

Earlier reports by Esteban *et al*⁶ describe the use of a Strecker tantalum metal balloon expandable stent to repair an external artery dissection after kidney transplant, while Kim *et al*⁷ reported transluminal recanalisation prior to surgical reconstruction.

Learning points

- Rare but reversible differential diagnoses after kidney transplantation must be considered as part of patient assessment.
- Appropriate but also timely imaging is necessary to establish or exclude these diagnoses.
- In our department, Doppler ultrasound is now carried out at the bedside as part of the assessment of oligo/anuria after kidney transplantation, and should be performed early in this clinical situation.

Contributors GL collected the information for the case report and reviewed the literature. GL produced a first draft from which GL, AB, TD and MLN jointly wrote the manuscript. TD and MLN operated on the patient.

Competing interests None.

Patient consent Obtained.

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Figure 2 The dissection in the EIA has been bypassed with a RSVG from the origin of the IIA to the EIA distal to the repaired Carrel patch (A). Anastomoses: (1) RV to the stump of the caval patch (B), (2) RA to the IIA and (3) transplant ureter to native ureter (C). EIA, external iliac artery; IIA, internal iliac artery; RA, renal artery; RSVG, reverse saphenous vein graft; RV, renal vein.

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