Introduction

Vascular complications are uncommon after renal transplantation, accounting for less than 10% of all complications. We report a case of external iliac artery dissection in a renal transplant recipient who was diagnosed in the early post-operative period and successfully managed with endovascular stenting.

Case presentation

A 52-years-old man with end-stage renal failure due to IgA nephropathy underwent cadaveric renal transplantation in our unit in December, 2019. He had hypertension which was controlled with oral Metoprolol 75mg twice daily and Losartan 50mg daily. Renal transplantation was carried out with a Gibson incision and the graft was placed at the extraperitoneal space. The external iliac artery and the graft artery did not have atherosclerotic plaques. The graft vessels were Anastomosed to the external iliac vessels in an end-to-side, continuous manner using non-absorbable, monofilament sutures (6-0 Optilene, Braun, Hessen, Germany). Graft perfusion was well after anastomosis. Post-stenting angiogram confirmed restoration of blood flow in the entire external iliac artery (Fig. 1D). Two self-expanding nitinol stents (SMART, Cordis, Santa Clara, CA, USA) were deployed in the external iliac artery, just proximal to origin of the graft artery. The differential diagnoses would be dissection and acute thrombosis. The etiology is yet to be fully understood. The presentation, investigation and management of this condition are highly variable. Here we report a 52-year-old man successfully treated by endovascular stenting with nitinol stents for an external iliac artery dissection proximal to the anastomosis.

Discussion

Iliac artery dissection is a rare complication after renal transplantation. The sign of a poorly perfused graft kidney after anastomosis during transplantation should alert the surgeon of the possibility of dissection. Post-operatively, hypertension, fluid retention, oliguria, renal bruit and acute lower limb ischemia are all warning signs of iliac artery dissection.

It is believed that iliac artery dissection may occur after endothelial injury due to traumatic vascular clamping or suturing during surgery. Proposed risk factors include the presence of atherosclerosis, polycystic kidney disease, polycythemia and the use of balloon dilators during angioplasty.
Fig. 1A. Doppler ultrasonography of the graft renal artery showing a dampened, low-resistance waveform. The renal arterial resistive index (RI) was reduced to 0.45.
Kidney disease, and vascular collagen disorders. Courtois et al. reported a case of iliac artery dissection with extension to the anastomosis in a patient with adult polycystic kidney disease.

Microscopic examination of the dissected artery demonstrated disrupted elastic lamellae in the media, but there was no abnormality in the general collagen and smooth muscle organization. In our center, we routinely use metallic vascular clamps in controlling the external iliac artery before anastomosis. The Table summarizes the reported cases of iliac artery dissection post-renal transplantation in the literature.

### Table 1

| Authors                  | Age of patient | Cause(s) of renal failure | Clinical presentation | Interval from transplant to diagnosis | Mode of diagnosis | Treatment | Follow-up |
|--------------------------|----------------|--------------------------|-----------------------|---------------------------------------|-------------------|-----------|-----------|
| Merkus et al. (1992)     | 33             | Chronic pyelonephritis   | Hypertension, fluid retention | 6 months                             | Angiogram         | Dacron bypass | 16 years  |
| Breta et al. (1999)      | 58             | Polycystic kidney disease| Renal bruit           | 2 days                                | Angiogram         | Conservative | 9 months  |
| Courtois et al. (1999)   | 47             | Polycystic kidney disease| Leg pain              | 16 hours                              | Computed tomography | Arterial graft | *         |
| Delles et al. (2002)     | 59             | Intestinal nephropathy   | Loss of graft perfusion on Doppler USG | 5 days                               | Angiogram         | Endovascular stent (Perflex) | 3 months |
| Russo et al. (2010)      | 50             | Glomerulonephrosis       | Anuria, hypertension   | Immediate post-operative             | Doppler USG       | Endarterectomy | 1 year    |
| Tsai et al. (2013)       | 52             | Chronic transplant nephropathy | Fluid retention      | 9 days                                | Angiogram         | Saphenous vein bypass | 1 year    |
| Lee et al. (2014)        | 38             | Cyclosporin A nephropathy| 5 patients included   | Intra-operative                       |                  | PTFE graft | 1 year    |
| Dar et al. (2016)        | *              | Diabetes mellitus in 4 patients | Glomerulonephritis in 1 patient | Intra-operative                       |                  |           |           |
| Knap et al. (2016)       | 33             | Unknown                  | Anuria                | 3 hours                               | Angiogram         | PTFE graft | 3 months  |
| Zarrab et al. (2018)     | 55             | Intestinal nephropathy   | Leg numbness          | Intra-operative                       | Doppler USG       | Suture, Dacron patch | 10 days  |
| Karasseit et al. (2018)  | 54             | Polycystic kidney disease| Oliguria              | 4 days (re-operation)                 | Clinical diagnosis | PTFE graft | *         |
| Lushina et al. (2018)    | 45             | Atherosclerosis          | Persistent elevated serum creatinine | 5 days                              | Computed tomography | Saphenous vein interposition graft | 2 years    |
| Vijayakumari et al. (2019)| 60            | Polycystic kidney disease| Oliguria              | 4 hours                               | Computed tomography | Endovascular stent (Absolute Pro) | 2 years    |
| Our case                 | 52             | IgA nephropathy          | Oliguria              | 4 hours                               | Computed tomography | Endovascular stent (SMART) | 6 months |

Abbreviations: PTFE, polytetrafluoroethylene; USG, ultrasonography; *, not mentioned in the literature.
Fig. 1D. Right common iliac arteriogram showing total occlusion extending from proximal to distal external iliac artery, just proximal to origin of the graft renal artery (arrowheads).

Fig. 1E. Post-stenting arteriogram showing significantly improved blood flow in the entire right external iliac artery.
use of soft clamps and clamping away from atherosclerotic plaques have
been recommended to reduce the chance of dissection.

The treatment of iliac artery dissection after renal transplantation is
not well-established due to the rarity of the condition. Management
strategies reported in the literature included surgical bypass, grafting,
endarterectomy and endovascular stenting. One patient was treated
conservatively in view of stable graft function and absence of lower limb
claudication. The treatment decision should be based on the extent of
dissection, timing of diagnosis, conditions of the transplant kidney and
patient, availability of vascular stents and angiographic resources, and
surgeons’ expertise. All graft kidney functions were preserved with
various treatment methods in the literature. Our patient received
endovascular stenting, which was minimally-invasive, safe, and effec-
tive. In view of the current limited evidence, a multi-disciplinary
approach should be adopted in the management of iliac artery dissec-
tion involving urologists, nephrologists and interventional radiologists.

Conclusion

Although iliac artery dissection in renal transplantation is rare, it can
result in significant morbidities and graft failure. Prompt diagnosis and
treatment can preserve the graft function. Endovascular stenting is an
effective treatment option for this complication.

Declaration of competing interest

None.

References

1. Weber TM, Lockhart ME. Renal transplant complications. Abdom Imag. 2013;38(5):1144–1154. https://doi.org/10.1007/s00261-013-0005-9.
2. Merkus JW, Dun GC, Reinaerts HH, Huysmans FT. Iliac artery dissection after renal transplantation. Nephrol Dial Transplant. 1992;7(12):1242–1245. https://doi.org/10.1093/ndt/7.12.1242.
3. Courtois A, Nusgens BV, Delvenne P, et al. Dissection of iliac artery in a patient with autosomal dominant polycystic kidney disease: a case report. Aorta (Stamford). 2013;1(2):123–125. https://doi.org/10.12945/j.aorta.2013.12.012. Published 2013 Jul 1.