



Trauma and reconstruction

Iliac artery dissection – A rare complication of renal transplantation: A case report and literature review

Fu Ho Victor Cheung^a, Chi Ho Ip^a, Ka Fai Johnny Ma^b, Yiu Chung Lam^a, Tin Yu Chu^a, Wai Kit Ma^{a,*}

^a Division of Urology, Department of Surgery, Princess Margaret Hospital, 2 – 10 Princess Margaret Hospital Road, Lai Chi Kok, Hong Kong

^b Department of Radiology, Princess Margaret Hospital, 2 – 10 Princess Margaret Hospital Road, Lai Chi Kok, Hong Kong



ARTICLE INFO

Keywords:

Iliac artery
Dissection
Kidney transplantation

ABSTRACT

External iliac artery dissection is a rare and under-reported vascular complication after renal transplantation. 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.

Introduction

Vascular complications are uncommon after renal transplantation, accounting for less than 10% of all complications.¹ 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. However, he was found to have oliguria for consecutive 3 hours post-operatively. Doppler ultrasound showed a dampened, low-resistance waveform in the graft renal artery (Fig. 1A). Computed tomography angiogram revealed an occluded segment, 4.7cm in length, at the mid-external iliac artery proximal to the anastomosis (Fig. 1B and C). The differential diagnoses would be dissection and acute thrombosis. The common femoral artery, graft arterial anastomosis and renal artery were

all well-opacified. Digital subtraction angiography (DSA) was performed showing external iliac artery dissection (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. Post-stenting angiogram confirmed restoration of blood flow in the entire external iliac artery (Fig. 1E). He then received low-molecular weight heparin for one week and life-long aspirin subsequently. Doppler ultrasound performed at 2 days later showed patent graft renal artery with normal triphasic flow. The patient recovered well at 6 months post-operatively, with serial monitoring of renal function.

Discussion

Iliac artery dissection is a rare complication after renal transplantation. Merkus et al. described the first two cases in 1992,² with less than 20 cases being reported in the literature. The summary of reported cases is shown in Table 1.

This complication can present intra-operatively or in the early post-operative period. However, it can also occur up to 2 years 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

* Corresponding author. Room 333B, 3/F, Block J, Princess Margaret Hospital, 2 – 10 Princess Margaret Hospital Road, Lai Chi Kok, Hong Kong.
E-mail address: drmawk@gmail.com (W.K. Ma).

<https://doi.org/10.1016/j.eucr.2020.101429>

Received 19 September 2020; Accepted 22 September 2020

Available online 25 September 2020

2214-4420/© 2020 The Authors.

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

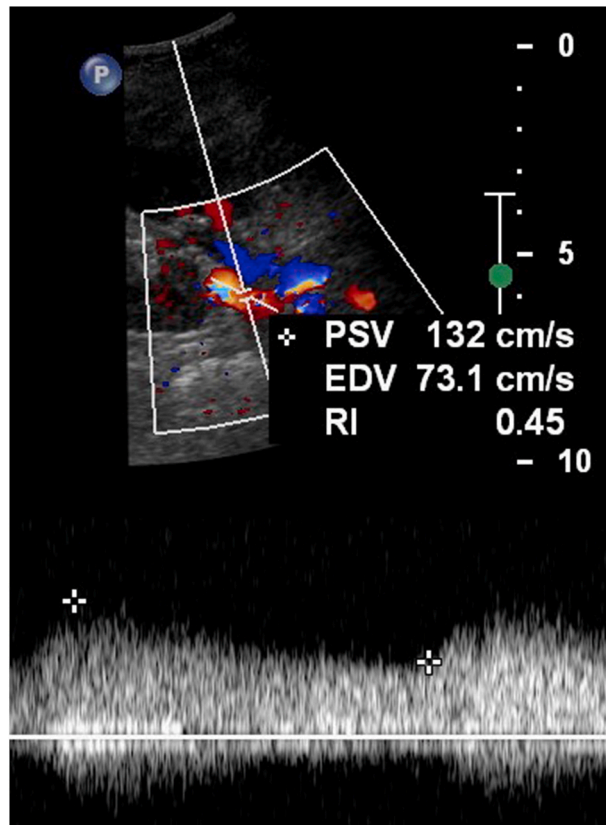


Fig. 1A. Doppler ultrasonography of the graft renal artery showing a dampened, low-resistance waveform. The renal arterial resistive index (RI) was reduced to 0.45.

Table 1
Summary of reported cases of iliac artery dissection post-renal transplantation in the literature.

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
Esteban et al. (1999)	50	Polycystic kidney disease	Renal bruit	2 days	Angiogram	Conservative	9 months
Courtois et al. (1999)	58	Atherosclerosis	Renal bruit	2 years	Angiogram	Endovascular stent (Strecker)	5 days
	47	Polycystic kidney disease	Leg pain	16 hours	Computed tomography	Arterial graft	*
Delles et al. (2002)	59	Interstitial nephropathy	Loss of graft perfusion on Doppler USG	5 days	Angiogram	Endovascular stent (Perflex)	3 months
Russo et al. (2010)	50	Glomerulonephritis		Intra-operative	Doppler USG	PTFE graft	1 year
Tsai et al. (2013)	52	Chronic transplant nephropathy	Anuria, hypertension	Immediate post-operative	Angiogram	Endarterectomy	14 days
Lee et al. (2014)	38	Cyclosporin A nephropathy	Fluid retention	9 days		Saphenous vein bypass	1 year
Dar et al. (2016)	*	5 patients included Diabetes mellitus in 4 patients Glomerulonephritis in 1 patient		Intra-operative		PTFE graft	1 year
Kirnap et al. (2016)	33	Unknown	Anuria	3 hours	Angiogram	PTFE graft	3 months
Zahran et al. (2018)	55	Atherosclerosis	Leg numbness	Intra-operative		PTFE graft	10 days
	45	Interstitial nephropathy	Oliguria	1 day		Suture, Dacron patch	
Karusseit et al. (2018)	54	Polycystic kidney disease		4 day (re-operation)	Doppler USG	PTFE graft	*
Lushina et al. (2018)	45	Atherosclerosis		Intra-operative	Clinical diagnosis	Saphenous vein interposition graft	2 years
Vijavergiya et al. (2019)	60	Polycystic kidney disease	Persistent elevated serum creatinine	Intra-operative	Computed tomography	Endarterectomy	3 months
Our case	52	IgA nephropathy	Oliguria	5 days	Computed tomography	Endovascular stent (Absolute Pro)	2 years
				4 hours	Computed tomography	Endovascular stent (SMART)	6 months

Abbreviations: PTFE, polytetrafluoroethylene; USG, ultrasonography; *, not mentioned in the literature.

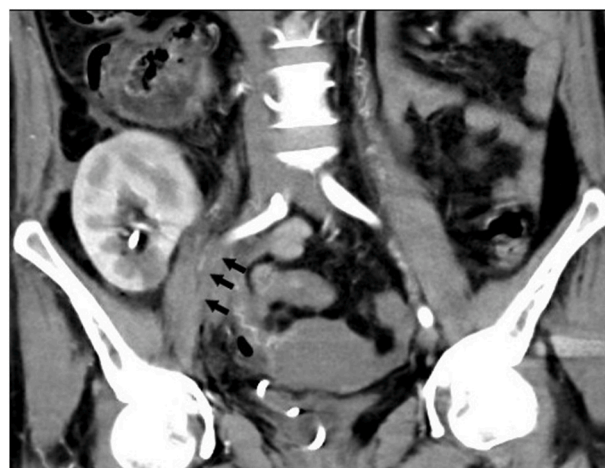


Fig. 1B. Computed tomography angiogram showing dissection of the right external iliac artery (arrows).

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.³ 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

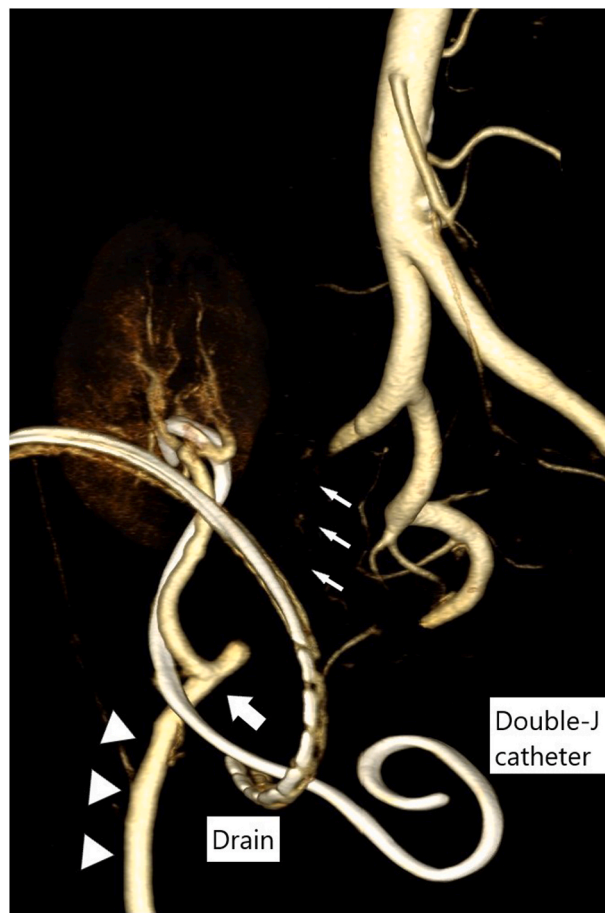


Fig. 1C. 3D-reconstructed image of computed tomography angiogram showing non-opacification of the middle part of the right external iliac artery (small arrows). The graft arterial anastomosis (large arrow), distal external iliac artery and common femoral artery (arrowheads) were patent.



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.² 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 effective. In view of the current limited evidence, a multi-disciplinary approach should be adopted in the management of iliac artery dissection 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.