

External iliac artery polytetrafluoroethylene graft interposition: An effective rescuer for kidney transplant in progressive intimal dissection of external iliac artery

Tanveer Iqbal Dar, Vipin Tyagi, Abdul Rouf Khawaja, Sudhir Chadha, Harsha Jauhari

Department of Urology and Kidney Transplant Surgery, Sir Ganga Ram Hospital, New Delhi, India

Abstract

Aims and Objective: The aim of this study is to highlight the use of polytetrafluoroethylene (PTFE) interposition graft as an important salvage procedure in case of irreparable intimal injury of external iliac artery during renal transplant recipient surgery.

Materials and Methods: Since 1987, we encountered irreparable intimal dissection of external iliac artery in five cases just after opening the clamp. It was successfully managed by PTFE interposition graft with subsequent end to side anastomosis of donor renal artery to the vascular graft.

Results: No patient had bleeding or infective complications related to the graft and three patients had immediate diuresis. Normal immediate graft function was present in three patients while the other two had delayed graft function.

Conclusion: Polytetrafluoroethylene interposition graft is a successful procedure to salvage the kidney and lower limb in case of progressive intimal dissection of external iliac artery during renal transplant surgery.

Key Words: Intimal dissection, interposition graft, poly-tetrafluoroethylene, renal transplant

Address for correspondence:

Dr. Tanveer Iqbal Dar, Department of Urology and Kidney Transplant Surgery, Sir Ganga Ram Hospital, New Delhi - 110 060, India.

E-mail: drtanveer@gmail.com

Received: 23.03.2013, Accepted: 26.06.2014

INTRODUCTION

External iliac artery intimal dissection is a rare but devastating complication which can occur at the time of the transplant during application or just after opening the vascular clamps. It results in compromised or absent blood flow to the graft and/or lower limb. The options for managing this emergency state are very limited. The paucity of literature regarding this complication makes the management more difficult.^[1-4] The aim of management is not only to salvage the graft kidney

but also to restore blood flow to the lower limb. We have used polytetrafluoroethylene (PTFE) interposition graft in order to restore blood flow to the graft kidney and lower limb. The aim of this study is to highlight the use of PTFE interposition graft as an important salvage procedure in case of irreparable intimal injury of external iliac artery during renal transplant recipient surgery.

MATERIALS AND METHODS

Since 1987 we have performed approximately 3000 renal transplant surgeries. In five occasions we encountered intimal dissection of external iliac artery just after opening the clamp following anastomosis of the donor kidney vessels to the recipient external iliac vessels. It was associated with changing color of the graft and external iliac artery to blue, along with absent pulse in right external iliac artery distal to anastomosis. A bluish discoloration was seen in the external iliac artery that

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/0974-7796.177199

seen extending caudally towards the femoral artery. Immediately the clamps were re-applied on both external iliac artery and vein in order to stop progression of the dissection. We dismantled the anastomosis (both arterial and venous) and immersed the kidney again in ice slush with cold perfusion. The arteriotomy was made and the artery was inspected. The intima was found shredded in pieces and did not hold sutures during an attempt to repair it. The irreparable segment of the artery was then removed and PTFE graft was interposed between the two ends of external artery. This restores blood flow to the lower limb. The graft kidney artery was then anastomosed to the interposition graft end to side using Gore-Tex (CV-6) suture (made of PTFE, by Ethicon), in a standard way, first vein followed by artery [Figure 1]. Both, the external iliac artery and vein were kept clamped during the whole process of renal vessel anastomosis (twice) and PTFE graft anastomosis. Postoperative immunosuppression was maintained by tacrolimus, mycophenolate mofetil and prednisolone.

RESULTS

Male:Female ratio was 4:1, mean age in years 45 (standard deviation = 3.5), basic disease leading to chronic renal failure (CRF) was diabetic nephropathy in four and chronic glomeruli-nephritis in one patient. Difficult vascular access and femoral cannulation for dialysis was present in three patients. Overall anastomosis time was <1 h in all the five cases and all had normal postoperative course with normally perfused graft kidney and lower limb. Immediate diuresis was seen in three patients while delayed graft function was seen in other two patients. Two patients had mild acute tubular necrosis in immediate post operative period which settled within a week. All patients were discharged at an average of 10th day after drain removal with a stabilized serum creatinine. No patient developed deep venous thrombosis, bleeding or infective

complications related to the graft. All the patients are alive with stable graft function except two who are having mild increase in serum creatinine because of medical reasons. The Doppler ultrasound at 1 year showed normal perfusion to the graft kidney and the lower limb in all the five patients. The post operative parameters of all the five patients have been assessed and represented in Table I.

DISCUSSION

Intimal dissection of external iliac artery is a rare but devastating event during or after renal artery anastomosis in renal transplant. This not only results in compromised blood flow to the graft kidney but also jeopardizes lower limb perfusion. The kidney transplantation in patient with previously subjected to vascular graft surgery has been documented. The first case of kidney transplantation over the vascular graft was published by Sterioff *et al.* in 1974.^[1] Brekke *et al.* reported 20 cases with reconstructive vascular surgery as preparation for renal transplantation.^[2] Gouny *et al.* reported five cases with simultaneous reconstructive vascular surgery and kidney transplantation.^[3] Similarly Van der Vliet *et al.* described 13 patients in whom vascular reconstruction and transplantation were carried out simultaneously and seven patients subjected to both procedures at different points in time.^[4] Tabet *et al.* concluded that renal transplantation over an aortobifemoral vascular graft is a valid and safe option in selected patients.^[5]

In all these reports the vascular reconstruction is either carried out prior to the kidney transplantation or at the time of transplant surgery as a planned procedure. The dissection of the external iliac artery during transplantation is an accident that not only puts life of the patient in serious risk but also demands an urgent solution in order to preserve the graft and lower limb. The solution to this emergency has not been described extensively in literature except some isolated case reports. Due to the few small series of patients and isolated case reports etiology, indications for repair, management options and prognosis remain unexplored. Russo *et al.* reported a single case of external iliac artery dissection

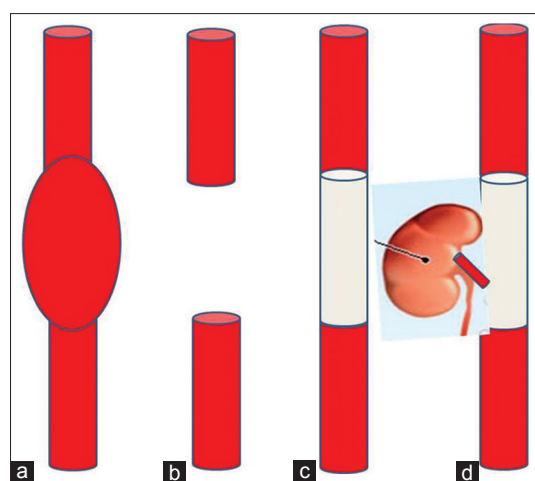


Figure 1: (a) Intimal dissection of external iliac artery (b) irreparable part excised (c) polytetrafluoroethylene graft interposed, and (d) renal artery anastomosed to the graft

Table 1: Detailed follow up of all the five patients

Case number	Cr. at 1 week, 1 m, 6 m and 1 year (mg/dl)	Diuresis	Warm ischemia time (1 st +2 nd) (min)	PTFE ave. anastomosis time (min) to EIA	PTFE length (cm)
1	1.8, 1.3, 1, 2	Delayed	22+33=55	60	4
2	2, 1.4, 1.2, 1.2	Immediate	20+30=50	60	5
3	1, 1.2, 1.3, 1.4	Immediate	23+35=58	60	4
4	1.7, 1.3, 1.4, 1.3	Immediate	25+33=58	60	4
5	2.4, 1.4, 1.4, 2.5	Delayed	25+35=60	60	6

Cr: Creatinine, Ave: Average, EIA: External iliac artery, PTFE: Polytetrafluoroethylene

during upstream declamping and managed it successfully by ilio-femoral bypass graft with end to side anastomosis of donor renal artery to the graft.^[6] Saito *et al.* reported a case of external iliac artery dissection with simultaneous kidney and pancreas transplantation, which was noticed during the operation and managed by self-expandable metallic stent.^[7] Moon *et al.* described the use of cadaveric donor iliac artery interposition graft in case of deceased donor for the same emergency.^[8] Woo *et al.* used endovascular stenting to salvage both graft and lower limb arterial flow secondary to a clamp injury recognized in the early postoperative period.^[9] All of our five cases were live kidney donor transplantation and thus we had the choice between stent or interposition graft. We used PTFE interposition graft after resecting the irreparable part of external iliac artery in order to restore blood flow to the lower limb, and the graft kidney was anastomosed to the graft.

The exact etiology of intimal dissection has not been defined well but probable risk factors include atherosclerosis, clamp trauma, and imperfect suturing. Also in patient with long standing CRF there is insufficient arterial wall connection. Thus arteries of these patients become more prone to dissection in case of improper application of clamps which cause trauma to the intima and during anastomosis when intima is not included in the suture. In both of these conditions intima is prone to get separated and results in dissection.

Retrospective evaluation of preoperative parameters was done in all the five patients. Four of them had long standing diabetes and 2 of these 4 along with one more had history of difficulty in vascular access (arterio-venous fistula). The pre operative vascular evaluation was normal in all patients. Thus it is very difficult to suspect the possibility of this precarious event. Intraoperatively it is prudent to be meticulous at the time of surgery. It is advisable to apply the vascular clamps appropriately and do proper suturing during vascular anastomosis so as not to leave behind the intima. Thus there is no substitute of proper surgical skills.

One more point needs to be addressed is that although we use CV-6 sutures routinely, prolene can be used safely. Also

although tacrolimus provided excellent functional outcome in our experience but the standard teaching is to avoid calcineurine inhibitors in such circumstances.

CONCLUSION

Intimal dissection of external iliac artery at the time of kidney transplantation is a rare but devastating acute emergency which needs not only best of the skills but also demands a cool approach. PTFE interposition graft is a successful procedure to salvage the kidney and lower limb in case of such progressive intimal dissection in external iliac artery.

REFERENCES

1. Sterioff S Jr, Zachary JB, Williams GM. Dacron vascular grafts in renal transplant patients. *Am J Surg* 1974;127:525-8.
2. Brekke IB, Lien B, Sodal G, Jakobsen A, Bentdal O, Pfeffer P, *et al.* Aorto-iliac reconstruction in preparation for renal transplantation. *Transpl Int* 1993;6:161-3.
3. Gouny P, Lenot B, Decaix B, Rondeau E, Kitzis M, Lacave R, *et al.* Aorto-iliac surgery and kidney transplantation. *Ann Vasc Surg* 1991;5:26-31.
4. van der Vliet JA, Naafs DB, van Bockel JH, Kootstra G, Boll AP, Barendregt WB, *et al.* Fate of renal allografts connected to vascular prostheses. *Clin Transplant* 1996;10:199-202.
5. Aguilera-Tubet C, Gutiérrez-Baños JL, Portillo-Martín JA, Valle Del Schaán JI, Correas-Gómez MA, Roca-Edreira A. Kidney transplantation over aorto-bifemoral vascular graft. *Actas Urol Esp* 2008;32:341-4.
6. Russo E, Sciano D, Cerbone V, Valeriani G, Barbato G, Rosa De P. *Transplant Proc* 2010;42:1365-6.
7. Kimura T, Saito T, Tsuchiya T, Kenjo A, Anazawa T, Abè T, *et al.* Treatment of external iliac artery dissection with endovascular stent placement in a patient with simultaneous pancreas and kidney transplantation. *Transplant Proc* 2005;37:3572-3.
8. Moon JI, Ciancio G, Burke GW. Arterial reconstruction with donor iliac vessels during pancreas transplantation: An intraoperative approach to arterial injury or inadequate flow. *Clin Transplant* 2005;19:286-90.
9. Woo EY, Milner R, Brayman KL, Fairman RM. Successful PTA and stenting for acute iliac arterial injury following pancreas transplantation. *Am J Transplant* 2003;3:85-7.

How to cite this article: Dar TI, Tyagi V, Khawaja AR, Chadha S, Jauhari H. External iliac artery polytetrafluoroethylene graft interposition: An effective rescuer for kidney transplant in progressive intimal dissection of external iliac artery. *Urol Ann* 2016;8:223-5.

Source of Support: Nil, **Conflict of Interest:** None.