

CASE REPORT

Repair experience of external iliac artery dissection using internal iliac artery transposition during renal transplantation

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ABSTRACT

Graft and surgery-related complications still pose a problem in kidney transplant surgery. Vascular complications due to surgery can be severe, threatening both graft and recipient life. Various treatment approaches have been described in the literature for vascular complications diagnosed peri-operatively and post-operatively. However, studies that provide long-term results on which approach will be applied in which period and in which conditions are limited. In this case report, we share our 6-year patient follow-up experience and repair of external iliac artery dissection related to renal transplantation with internal iliac artery transposition.

Keywords: External iliac artery dissection; internal iliac artery transposition; kidney transplantation; vascular emergencies; vascular injury.

INTRODUCTION

Kidney transplantation surgery and graft complications still pose serious problems leading to graft loss. The main surgical complications are vascular fortunately, and vascular complications comprise 10% of the complications related to kidney transplantation. The arterial origin may be more severe than venous complications. External iliac artery dissection is an extreme emergency complication.

Poor quality of arterial wall, diabetic vascular changes, atherosclerosis, vessel clamp injuries, the traumatic anastomotic suturing that damages the arterial intima may lead to arterial dissection. It requires a multidisciplinary approach to save both the transplanted kidney and the lower extremity.

Transplant-related external iliac artery dissection can be detected during or after surgery. Synthetic vascular grafts, endovascular stents, iliac artery allografts, saphenous vein grafts, and endarterectomy are shown as treatment options in the treatment.

CASE REPORT

A 41-year-old female patient underwent pre-emptive living donor kidney transplantation from a donor of third-degree relation in 2016 as a result of medullary cystic kidney disease. The consent form was obtained from the patient. The patient had a history of hypothyroidism, chronic renal failure diagnosed by kidney biopsy 7 years ago, and left inguinal hernia repair. The patient underwent standard pre-transplant recipient evaluation. Apart from routine evaluation, the patient had pre-transplant tomography for renal colic. No calcification in bilateral external and internal arteries was evaluated on non-contrast tomography.

First, an end-to-side anastomosis was performed on the right external iliac vein. The anastomosis was performed with 6.0 polypropylene using vessel clamps for vessel control. Afterward, external iliac artery control was achieved using vessel clamps. The anastomosis was performed using 7.0 polypropylene, two renal arteries, and one renal vein anastomosis. Anastomosis time for reperfusion is about

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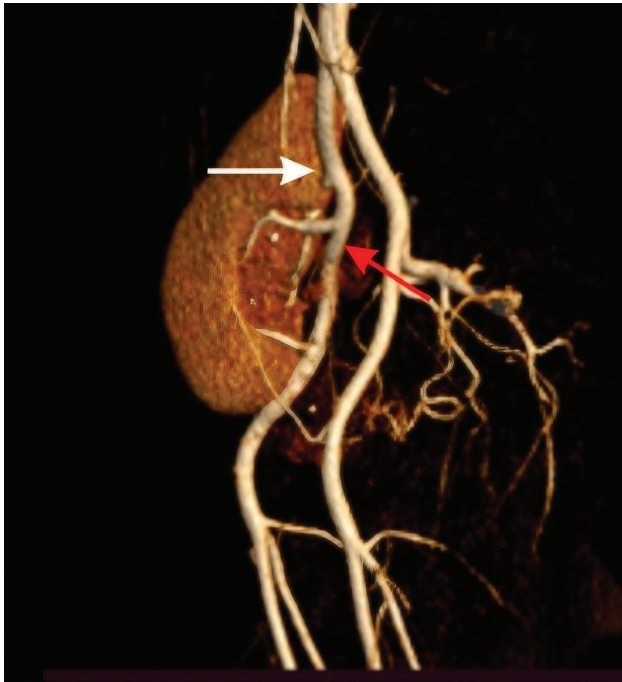


Figure 1. External iliac artery stump (white arrow) and renal artery anastomosis to internal iliac artery (red arrow).

50 min. Renal perfusion and good color were achieved after the vascular clamps were released. However, the kidney tonicity began to disappear after ureteroneocystostomy. Pulsation disappeared first in the distal of the anastomosis in the external iliac artery and then in the proximal. Vascular clamps were placed, and the kidney was quickly removed. After kidney removal, intimal damage and dissection were observed. The vascular surgeon called in for vascular reconstruction assistance and consulted. It was decided that the dissection area in the external iliac artery would not be suitable for re-anastomosis after repair. Since the internal iliac artery and external iliac artery diameters were close, internal iliac artery transposition was planned to ensure reperfusion. Subsequently, the internal iliac artery was released distally, and end-to-end anastomosis was performed on the external iliac artery. Both kidney arteries were re-anastomosed to the external and internal iliac artery end to side. The kidney's blood supply and pulsation in the distal external iliac artery and femoral artery were obtained following the anastomosis. After the transplantation, it was completed in its ordinary course. However, in the post-operative Doppler examination, it was reported that RI values increased in the proximal common femoral artery and were compatible with stenosis up to 50% with the monophasic flow. Furthermore, the physical examination observed no skin color or temperature change in the right leg. She was treated with low-molecular-weight heparin during her hospital stay. After discharge, she was followed up with low-dose aspirin.

In the 6-year follow-up of the patient, the serum creatinine level remained at 0.7 g/dL. There was a history of pain in the

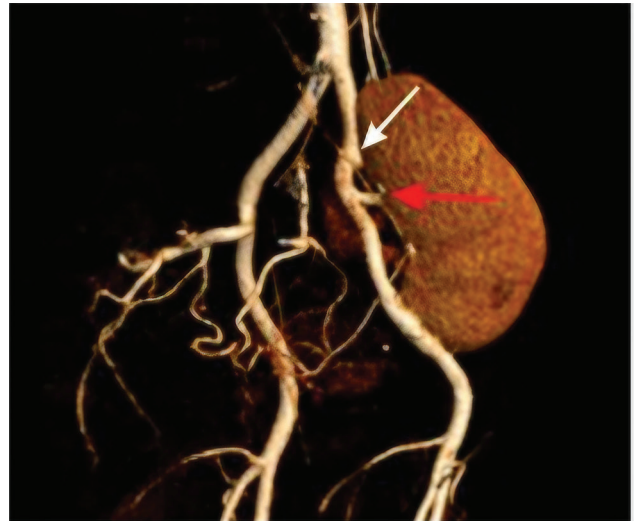


Figure 2. Anastomosis of external iliac artery stump (white arrow) and renal artery to internal iliac artery transposition (red arrow) from a different angle.

right leg from time to time, but she did not have symptoms such as gait disturbance or difficulty. Doppler ultrasound showed that all lower extremity arteries were open with triphasic flows in the patient's follow-up. Abdominal computed tomography angiography showed that the internal iliac artery diameter reached the diameter of the contralateral external iliac artery over time. The ability of the transplanted kidney to supply blood flow and lower extremities is satisfactory. Although perioperative external iliac artery dissection sequelae can be seen on CT angiography, it does not cause stenosis that will reduce blood flow in color Doppler ultrasound in 2022 (Figures 1 and 2).

DISCUSSION

Kidney transplantation is the best treatment for end-stage renal disease. However, many perioperative and post-operative complications can be successfully managed with a multidisciplinary approach. External iliac artery dissection is one of the more common perioperative or post-operative arterial complications among vascular complications.

External iliac artery dissection is a rare complication seen during renal transplantation. It is a condition that requires urgent intervention because of its devastating effect on the graft and the circulatory disorder; it causes in the lower extremity.^[1] It was first described by Merkus et al. in 1992.^[2] Post-operative hypertension, fluid retention, renal bruit, and lower extremity ischemia may be signs of iliac artery dissection. During the operation, loss of pulsation at the distal part of the anastomosis and deterioration in renal perfusion should suggest iliac artery dissection.^[3,4]

Knowing the risk factors well is essential to be aware of external iliac artery dissection. As predisposing factors, diseases

such as atherosclerosis, diabetes, hypertension, vascular collagen diseases, and polycystic kidney disease have been reported. Furthermore, vascular clamp and anastomotic suture damages are frequently cited for external iliac artery dissection. The main problem that should be known is that both underlying diseases and surgical handling that will cause endothelial damage may lead to dissection and other vascular complications.

The most commonly used treatment method is seen as synthetic vascular grafts. PTFE grafts are preferred both during and after surgery. Long-term follow-up is very successful.^[5] Endovascular stents can be selected as a treatment method early or late after surgery. On the other hand, treatment methods using the iliac artery or saphenous vein are preferred in external iliac artery dissections that are frequently detected peri-operatively. Management of external iliac artery dissection with endarterectomy is rare.

External iliac artery dissection should be well known by the surgeons operating and the physicians performing the follow-up. Although most of them can be diagnosed peri-operatively, external iliac artery dissection can occur days, weeks, months, or even years later. In addition to predisposing factors, using soft vascular clamps, positioning them away from calcifications, and careful anastomosis sutures taking into account intimal damage are essential in avoiding dissection.

Which method to choose in the treatment should be decided according to the location of the dissection, the time of diagnosis, and the overall condition of the patient and the renal allograft. Moreover, the transplant center's angiography and vascular surgery possibilities should be considered in the treatment planning. Bilateral internal iliac artery ligation may cause more severe complications.^[6] Compared to using artificial grafts, internal iliac artery transposition is a more advantageous option as it lowers the risk of infection and is also a simpler procedure. It has a lower risk of post-operative complications compared to an endarterectomy. Internal iliac artery transposition has been reported many times in retroperitoneal mass surgeries.^[3] However, adequate comparative studies have yet to be conducted between arterial transposition and PTFE grafts. In addition, Law et al. pointed out that the long-term results of arterial transposition in brachiocephalic occlusive disease are more successful than PTFE grafts.^[7] PTFE grafts have been used frequently *in situ* reconstruction and have been shown to have successful long-term results. Even though transplant surgery is a highly sterile surgery, a dissected donor ureter and a perforated recipient bladder for ureteroneocystostomy may pose a risk for vascular graft infection due to immunosuppressive conditions. Even if the incidence of vascular graft infection varies between 1 and 5%, it was found to be associated with mortality in the first 30 days at a rate of 10–25%.^[8] Vascular graft infection can become a life-threatening situation or organ loss. From

this perspective, arterial transposition carries a lower risk for vascular graft infection.^[9,10]

CONCLUSION

Data sharing long-term results are not available for the mentioned treatment methods. For this reason, it is not possible to say which method is more effective and long-lasting. Treatment options should be determined according to the patient's condition, diagnosis time, and the center's facilities. As the last sentence, prospective or retrospective sharing of cases and/or series is essential to reach an effective and safe treatment method or to form a guideline in case of external iliac artery dissection related to renal transplantation.

Sharing cases of external iliac artery dissection related to renal transplantation are crucial for developing effective treatment methods and guidelines.

Ethics Committee Approval: This study was approved by the Burhan Nalbantoglu State Hospital Research Ethics Committee (Date: 23.05.2022, Decision No: EK 27/22).

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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OLGU SUNUMU - ÖZ

Renal transplantasyon sırasında internal iliak arter transpozisyonu uygulanarak eksternal iliak arter diseksiyonu onarımı

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Greft ve cerrahiye bağlı komplikasyonlar böbrek nakli cerrahisinde hala sorun teşkil etmektedir. Ameliyata bağlı vasküler komplikasyonlar ciddi olabilir ve hem greft hem de alıcının yaşamını tehdit edebilir. Perioperatif ve postoperatif tanı konulan vasküler komplikasyonlar için literatürde çeşitli tedavi yaklaşımları tanımlanmıştır. Ancak, hangi yaklaşımın hangi dönemde ve hangi koşullarda uygulanacağı konusunda uzun vadeli sonuçlar veren çalışmalar sınırlıdır. Bu olgu sunumunda, renal transplantasyona bağlı eksternal iliak arter diseksiyonunun internal iliak arter transpozisyonu ile onarılması ve 6 yıllık hasta takip deneyimimizi paylaştık.

Anahtar sözcükler: Eksternal iliak arter diseksiyonu; internal iliak arter transpozisyonu; böbrek nakli; vask.

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