

SURGICAL PROCEDURES IN COMPLICATIONS OF RENAL TRANSPLANTATIONS : REPORT OF SEVEN CASES

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SUMMARY

Purpose: Despite great technical advances in renal transplantation, surgical complications, including renal artery stenosis (RAS), renal artery thrombosis, and ureteral complications represent a major cause of morbidity and mortality. In this study, the surgical correction techniques and their results are discussed. **Methods:** Seven different complicated kidney transplant patients were admitted and treated in our transplantation unit. **Results:** All patients were discharged from the hospital without any problem. **Conclusion:** As technical complications after meticulous surgical procedures are relatively infrequent, clinical suspicion of any possible complication requires prompt diagnosis and treatment. These principles are of great importance for saving grafts and the lives of patients.

Key words: Renal Transplantation, Surgical Complications.

INTRODUCTION

Surgical complications after renal transplantation are uncommon. However, if they occur, they may threaten patients or grafts, so prompt diagnosis and intervention is mandatory. Surgical complications may be divided into three groups as vascular, urologic and lymphatic.

Chronic renal failure patients generally have low nutritional status, anemia and predisposition to bleeding, all of which may lead to delayed wound healing and infection. Immunosuppressive therapy and rejection episodes can aggravate these conditions. Cadaveric kidneys or kidneys with multiple arteries have greater risks. Early vascular

complications include thrombosis, rupture with hemorrhage and obstruction. Their incidence is reported to be 0.1-0.3 % by several authors (1-4).

The most common delayed vascular complication is renal artery stenosis (RAS). The incidence of stenosis needing surgical repair is between 1% to 12% with current techniques (5).

Urological complications such as urine leaks, ureteral or pelvic necrosis occur in 1 to 15% of renal transplant procedures depending upon the type of reconstruction and renal source. They account for up to 60% of leaks and are caused by ischemic injury to the ureter at the time of harvesting, technical problems with the anastomosis or delayed healing secondary to immunosuppression or rejection (6-11).

Lymphatic complications, such as formation of a lymphocele, are usually due to technical errors at the time of surgical procedure. Their incidence may vary between 0.6-18% and their diagnosis and treatment are relatively easier (1,3,12).

From September 1996 to January 1999, six kidney transplant patients were referred to our hospital for correction of their various surgical complications. These were, one lymphocele, one ureteral necrosis, one urinary leak, one ureteral obstruction and two renal artery stenoses. Meanwhile, we additionally encountered a calicial fistula in a transplant patient and will hereby present these seven cases.

CASE 1

A 26-year-old male patient received a kidney from his mother. Three months after transplantation his creatinine value rose to 3.5 mg/dl and he had marked leg swelling observed at the graft side. Large perirenal collection and hydronephrosis were diagnosed with ultrasonography (US) and percutaneous nephrostomy was performed. The patient was treated with fenestration of the lymphocele to the peritoneal cavity (Fig. 1).

CASE 2

A 30-year-old male patient received a kidney from his mother. Ten days after surgery, a urinary leak from the wound was observed. He underwent surgery and ureteroneocystostomy was performed. Despite this procedure, the leak persisted. Therefore he was referred to our clinic.

We explored the patient and found that the transplanted kidney's ureter was totally necrotic. We decided to use the patient's native ureter, so we first performed nephrectomy at the transplantation side. Then, ureteropyelostomy and double-J (DJ) catheterization was performed. The patient was discharged uneventfully on the fifteenth postoperative day (Fig. 2).

CASE 3

A 46-year-old male patient received a kidney from an unrelated donor in Iraq. He was admitted to our clinic three weeks later with high fever and deteriorated kidney function (creatinine

4.8 mg/dl). On radiological survey, hydronephrosis and a large perirenal collection were found. The patient underwent surgical exploration and a small necrotic tissue was observed at the ureterovesical junction.

Ureteroneocystostomy, DJ catheter insertion and nephrostomy catheter placement were performed. On the tenth postoperative day, an antegrade pyelograph was obtained, which revealed no extravasation (Fig. 3). We closed the nephrostomy for two days and then removed it. After nephrostomy removal, a urine leak started and continued for seven days. As the patient's creatinine value was 1 mg/dl, an IVP was performed which revealed calicial fistula, so the patient underwent a second operation. A small fistula tract was seen at the nephrostomy tract and it was treated with fistula excision and flap-omentoplasty. The patient was discharged ten days later with excellent kidney function.

CASE 4

A 28-year-old female patient received a kidney from a cadaver seven years earlier. She had severe hypertensive attacks during the previous year (280/160 mmHg despite four-drug antihypertensive regime). Doppler US and renal angiography showed nearly 90% stenosis of the renal artery of the transplanted kidney (Fig. 4a).

On surgical exploration, the vascular system were dissected carefully. Seven years before, the first arterial anastomosis had been performed to the external iliac artery end to side. We decided to use a saphenous vein graft and the transplanted kidney was perfused and cooled with UW solution. A new arterial anastomosis was performed with saphenous vein interposition, end to end with the internal iliac artery (Fig. 4b). Postoperative course was uneventful and the patient was discharged with a 1.6 mg/dl creatinine value and 160/100 mmHg arterial pressure.

CASE 5

A 47-year-old male patient received a kidney from a cadaver four years earlier. He had severe hypertension for the last two years and given triple drug antihypertensive treatment. Doppler US and renal angiography showed over 80% stenosis of the renal artery of the transplant



Fig. 1: (a) Large perirenal collection, displacement of urinary bladder and hydronephrosis of transplanted kidney. (b) After peritoneal drainage hydronephrosis dissolved.

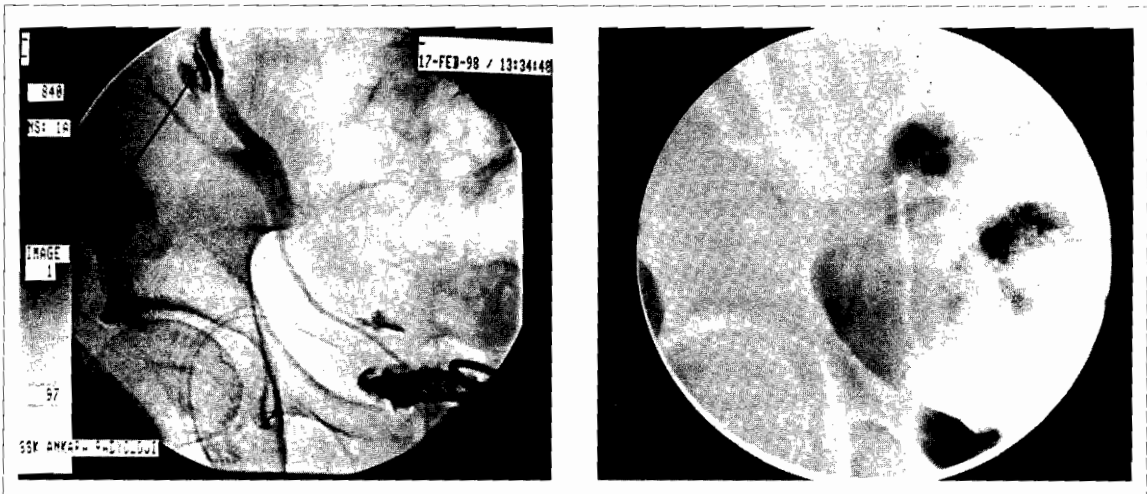


Fig. 2: (a) Urinary leak was seen from transplanted ureter. (b) Ureteropyelostomy was performed using patient's native ureter and DJ catheter replacement. Anterograde pyelography showed free contrast passage to urinary bladder.



Fig. 3: Anterograde pyelography showed there was no extravasation after ureteroneocystostomy.

kidney. PTA had been performed one year before and his hypertension improved, but this lasted only a few months and hypertension had worsened at the time of examination. Repeat renal angiography showed over 90% stenosis (Fig. 5a). On surgical exploration, the internal iliac artery was carefully dissected and the narrowed portion of the internal iliac artery was resected and anastomosed with the renal artery using the autologous saphenous vein. Postoperative course was uneventful. The patient was discharged on the seventh postoperative day with stable kidney function and 145/90 mmHg arterial pressure (Fig. 5b shows patient's postoperative renal angiography).

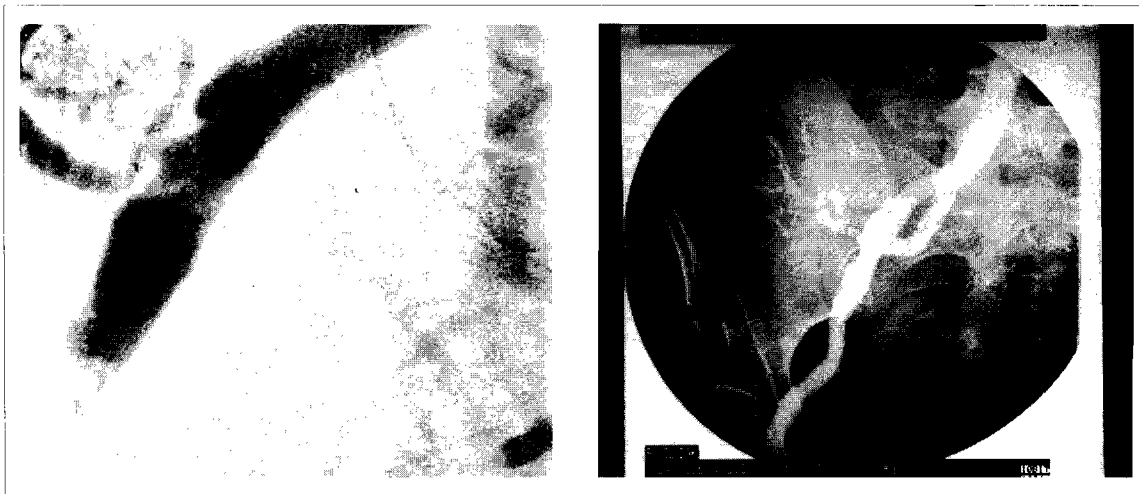


Fig. 4: (a) Renal angiography showed over 90% stenosis of the transplanted renal artery (end to side external iliac artery), (b) saphenous vein interposition, new anastomosis performed (end to end) to the internal iliac artery.



Fig. 5: (a) Preoperative over 90% renal artery stenosis of the transplanted kidney (end to end internal iliac artery), (b) saphenous vein interposition, new anastomosis performed (end to end) to the internal iliac artery.



Fig. 6: (a) Severe ureterovesical stenosis of the transplanted kidney. (b) anterograde pyelography of the same patient after "Boary Flap" ureteroplasty.



Fig. 7: (a) Augmented cystoplasty was performed using 25 cm ileal anse seqment. Post operative urinary bladder capacity reached 200 ml, (b) antegrade pyelography without leak after omentoplasty of calicial fistula.

CASE 6

A 43-year-old female patient received a kidney from her mother 18 months earlier. She was admitted to hospital with deteriorating kidney functions (creatinine 3.4 mg/dl). A large hydronephrosis was diagnosed ultrasonographically and a percutaneous nephrostomy was performed. Anterograde pycelography showed ureterovesical stenosis. She was treated with Boary flap ureteroplasty and discharged with 1.2 mg/dl creatinine value (Fig. 6).

CASE 7

A 9-year-old female chronic renal failure patient who had primary renal disease as reflux nephropathy also had a contracted bladder because of recurrent infections. Her urinary bladder capacity was nearly 50 ml. Before tranplantation surgery, augmented cystoplasty was performed by using a 30 cm ileum segment (Fig. 7a) and the bladder capacity reached 200 ml. Six weeks later, a transplantation surgery was planned. Her father was prepared as donor. Transplantation operation as well as the first postoperative week were uneventful. The patient was discharged with 5000 ml/day urine and creatinine value was 1 mg/dl. On the postoperative fifth day, she presented with a rejection episode and was treated by bolus methylprednisolone + ATG (Fresenius). After

reversal of the rejection episode, the patient started to urinate again but a large urine leak was observed from the wound. We decided to explore the patient and found a 2 cm diameter renal cortical necrosis on the upper pole of the kidney. Because the kidney had a single artery, the etiology of the necrosis could not be explained. It might have been due to the thrombosis of some branches the of renal artery during the rejection episode. Resection of the necrotic tissue and omentum flap were performed. A DJ catheter and a nephrostomy tube were also inserted. (Fig. 7b shows the patient's anterograde pyelography which was taken on the twelfth postoperative day.) The patient was discharged with excellent kidney function (1 mg/dl creatinine) and is still being followed in our Pediatric Nephrology Unit since 18 months.

DISCUSSION

Original pelvic kidney transplantation was first described by René Kuss in 1951. From that time, no major change occurred in surgical techniques but early diagnosis of complications and rejection using interventional radiologic procedures have progressed tremendously (8).

In early reports of renal transplantation, the incidence of urologic complications varied from 10 to 25 % and the mortality associated with these complications was 20-30% (13,14). Percutaneous placement of a nephrostomy catheter under US guidance is a simple and effective method which allows recovery of renal

function and provides time for further evaluation and definitive treatment (7).

Periallograft lymphocele is relatively common following kidney transplantation. The incidence has been reported as 0.6-18 % (1,3,12). Lymphocele development is thought to be related to non-ligated lymphatics of the hilum of the renal allograft. Symptomatic lymphoceles require drainage. Because of the high recurrence rate, percutaneous drainage is not considered (9). Peritoneal fenestration with internal drainage is the usual treatment, as we performed in our case. Recently, some authors have also reported successful laparoscopic internal drainage (12).

Early vascular complications are thrombosis and hemorrhage. Renal arterial thrombosis mostly depends on technical errors and usually causes graft loss. Fortunately, this is an extremely rare complication (1,3,4). The incidence of stenosis that needs surgical repair is between 1 to 12 % (5). The causes include faulty suture technique, damage to the donor arterial intima during perfusion, intimal damage from rejection, improper apposition of donor and recipient vessels with torsion, and excessive length of the donor artery leading to angulation or atherosclerosis in the recipient artery (5). Various techniques have been described for secondary arterial vascularisation of renal allograft. We preferred saphen vein interposition end to end anastomosis of the internal iliac and renal artery in our cases.

Urologic complications, such as urinary leaks, ureteral obstruction, ureteral or pelvic necrosis can occur in 1 to 15 % of kidney transplants (1,3,6). Leaks in the early transplant period present with pain, swelling and discharge from the wound. Percutaneous stenting sometimes solves the problem. If it fails, definitive therapy is necessary. Three of our cases had leaks, one of which had ureter necrosis. The others were due to calicial necrosis. We performed ureteropyelostomy (with native ureter), ureteroneocystostomy, fistula excision and flap omentoplasty, and all of the patients were cured. Urinary tract obstruction following renal transplantation occurs in less than 5 % of the patients (1). Obstruction may occur due to intrinsic causes (stone fibrosis, fungus ball, plug, etc.) or extrinsic causes (lymphocele, urinoma, hematoma, etc.). In our case, severe fibrosis was located at the ureterovesical junction and with

Boary flap ureteroplasty we solved the problem (Fig. 6b).

In conclusion, technical complications after meticulous surgical procedures are relatively infrequent, clinical suspicion of any possible complication requires prompt diagnosis and treatment. These principles are of great importance for saving the grafts and lives of patients.

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REFERENCES

1. Belzer FO, Glass N, Soolinger H. Technical complications after renal transplantation. In: Morris P (ed) : Kidney Transplantation. 3rd ed. Philadelphia : WB Saunders 1988; p : 511-532.
2. Irish AB, Green FR, Gray DWR, Morris F. The Factor V Leiden (R506Q) Mutation and risk of thrombosis in renal transplant recipients. *Transplantation* 1997; 64 : 604-607.
3. Odland MD. Surgical technique-posttransplant surgical complications. *Surg Clin NA* 1998; 78 : 55-60.
4. Tellis AV, Matas AJ, Veith FJ. Vascular complications of transplantation. In: Cerilli JG (ed) : Organ Transplantation and Replacement. Philadelphia: JB Lippincott 1988; p : 423-432.
5. Novick AC. Secondary renal vascular reconstruction for arterial disease in native and transplant kidney. *Urol Clin NA* 1994; 21 : 255-263.
6. Bennet AH. Urologic complications of renal transplantation. In: Cerilli JG (ed) : Organ Transplantation and Replacement. Philadelphia: JB Lippincott 1988; p : 433-437.
7. Kashi SH, Lodge JPA, Giles GR, Irving CH. Ureteric complications of renal transplantation. *Br J Urol* 1992; 70: 139-143.
8. Lee MH. Surgical techniques of renal transplantation. In: Morris P (ed): Kidney Transplantation. 3rd ed. Philadelphia : WB Saunders 1988; p : 215-233.
9. Sert Ş, Gülay H, Hamaloğlu E, Haberal M. Urological complications in 350 consecutive renal transplants. *Br J Urol* 1990; 66 : 568-571.
10. Theodorou CH, Kostakis A, Bokus J, Plastinas D, Vosdines G. Lower urinary tract reconstruction in association with renal transplantation. *Int Urol Nephrol* 1997; 29 : 695-699.
11. Youssef NI, Jindal R, Babayan RJ, Carpinto GA, Idelson BA, Bernard DB, Cho SI. The acusise catheter: A new endourological method for correcting transplant ureteric stenosis. *Transplantation* 1994; 57 : 1398-1400.

12. Ratner LE, Bender JS. A novel approach to the drainage of loculated perirenal allograft lymphoceles: Dual scope laparoscopy. *Transplantation* 1994; 58 : 961-963.
13. Colfry AJ Jr, Schlegel JU, Lindsey ES, et al. Urological complications in renal transplantation. *J Urol* 1974; 112 : 564-566.
14. Loughlin KR, Tilney NL, Richie JD. Urological complications in 718 renal transplant patients. *Br J Urol* 1981; 53 : 397-402.