Two cases of a very rare complication in patients with acute post-transplant kidney insufficiency

Krzysztof Tupikowski[1], Janusz Dembowski[1], Marian Klinger[2], Maria Boratynska[2], Tomasz Szydełko[1], Dariusz Patrzałek[3], Romuald Zdrojowy[1]

[1]Department of Urology and Oncological Urology, Wroclaw Medical University, Wrocław, Poland
[2]Department of Nephrology and Transplantation Medicine, Wroclaw Medical University, Wrocław, Poland
[3]Department of Vascular, General and Transplantation Surgery, Wroclaw Medical University, Wrocław, Poland

KEY WORDS

kidney ◗ kidney transplant ◗ post-transplant renal insufficiency ◗ ureteral complications

ABSTRACT

Background. Renal transplantation is performed in thousands of patients with end-stage renal disease. The most common complications are ureteral or ureterovesical junction pathologies. We describe two very rare cases of a complication of unknown mechanism following renal transplant.
Case report 1: A 57-year-old woman was evaluated after renal transplantation. The graft did not regain its function postoperatively because of acute posttransplant renal insufficiency. Redon tube drainage rose to 575 ml on day 11 and to 1360 ml on day 12. Fluid analysis and cystography led to the conclusion that no ureteroneocystostomy existed. Reoperation followed. The kidney was rescued and the patient discharged in good condition.
Case report 2: A 30-year-old woman with acute post-transplant renal insufficiency after renal transplantation was evaluated. Drain tubes were removed on day 8. Graft biopsy was performed on day 16 because of suspected acute graft rejection. No aberrancies on histology were seen. The patient's general condition worsened and ascites developed. During cystoscopy, no distal end of the JJ-cathether was seen, which led to the conclusion that no ureteroneocystostomy existed. She was reoperated on day 23 posttransplant. The kidney was rescued and the patient was discharged in good condition.
Conclusions. The most common cause of urine leakage in kidney transplant recipients is ureteroneocystostomy leak. The possibility of a lack of any junction between the ureter and bladder should be taken into account. Cystoscopy and cystography, which are fast to perform and not cumbersome to the patient, should be performed early as they allow for fast and reliable diagnosis before reoperation.

BACKGROUND

The first successful renal transplantation in 1954 opened a new era in the treatment of patients with end-stage renal disease, with thousands of transplantations now being performed yearly worldwide. Urological complications are a major if not the primary cause of failure. Their absolute number has not significantly changed since the first patients despite continuous perfection of surgical techniques, causing their relative rise in frequency among all complications. The most common are of ureteral origin. Ureterovesical anastomosis leak and graft ureter necrosis present as urine leakage and urinal fistulas. Also common are ureteral urine flow obstructions caused by extra- (lymphocele, hematoma) or intra-ureteral (blood clot, ureterovesical junction stricture) block. Urinary stone disease and graft vascular thromboses are less commonly noted. A constant observation in renal graft recipients is ureterovesical reflux which, in contrast to the above, usually does not have any influence on transplant outcome [1].

The authors present to their knowledge the first two such cases of complications of unknown mechanism following renal transplant in a group of 1203 patients from a Transplant Institute in Wrocław.

CASE REPORT

Case 1

A 57-year-old woman underwent renal transplantation in June 2007. The primary renal disease, chronic mesangio-capillary glomerulonephritis, was diagnosed in 1989. Hemodialyses were started in May 2006 following left arterio-venous shunt creation with the Brescii method. In September 2006 she was qualified for the transplant program. Ultrasonography (USG) revealed heart septum hypertrophy with normal global function without any contraction anomalies. Chest radiography, electrocardiogram (ECG), gastrofiberoscopy, and abdominal and minor pelvic USG as well as specialist consultations (gynecologist, surgeon, cardiologist, laryngologist, dentist, ophthalmologist) did not reveal any findings. Virusological investigations were negative for human immunodeficiency virus (HIV) and hepatitis viruses A, B, and C (HAV, HBV, HCV). In her childhood she underwent appendectomy and tonsillectomy. After successful qualification, lovastatine, epoetine alpha-2, calcium carbonate, and vitamins (B1, B6, E, folic acid) were administered as well as occasional oral metoprolol and perindopril.

The transplant procedure was carried out. The left kidney from a deceased 60-year-old donor was placed classically in the right iliac fossa. Both donor and recipient were A Rh positive. The donor's HLA antigens were A 3,10, B 16,5, DR 5,6 and the recipient's A 10,29, B 15,35, DR 4,5. Cold hypoperfusion time was 29 hours and warm 33 minutes. Ureteroneocystostomy was performed according to a modified Gregoir method (the so-called Gregoir-Stolarczyk method, described below) and the ureter was stented with a JJ catheter. Two Redon tubes were placed. As immunosuppression the patient received mofetil mycophenolate, cyclosporine A, and methylprednisolone followed by prednisone and, additionally, cefuroxime, ranitidine, nystatine, trymetoprim/sulfometoxazole, and nitrendipine.

Postoperative USG demonstrated rich, symmetrical graft blood flow with interlobular artery flow of about 30 cm/s. Both kidney vessels were permeable. Ureteroneocystostomy was not apparent. No collective system broadening or perirenal hematoma was visible.

The graft did not regain its function postoperatively because of acute posttransplant renal insufficiency. Diuresis was less than 200 ml/day despite oral 160 mg/d furosemide administration. Regular hemodialyses were per-

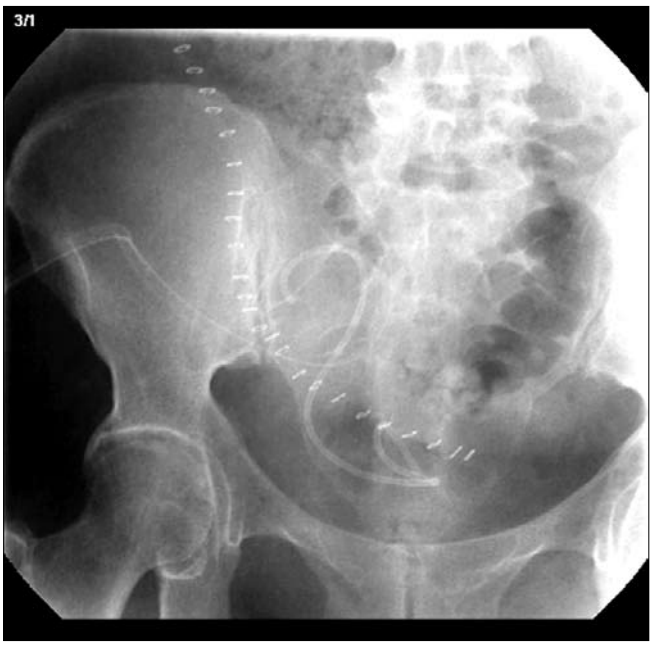

Fig. 1. Plain radiograph of the minor pelvis. Drain tube and JJ-catheter are visible. The proximal end of the JJ-catheter is projecting onto the transplanted kidney and the distal end onto the urinary bladder.

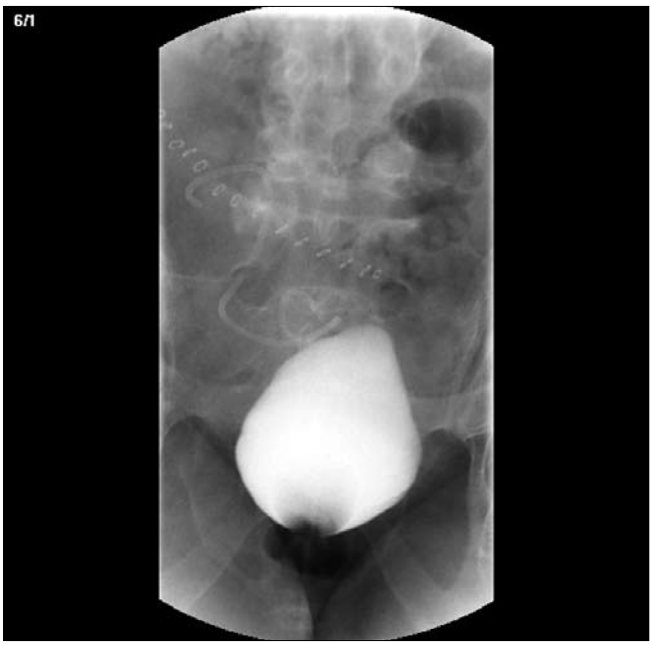

Fig. 2. X-ray of the minor pelvis after injection of contrast medium into the bladder via Foley catheter. Note the lack of opacification of the JJ-stent and its distal end lying on top of the bladder filled with contrast medium, with no contact with its lumen.

formed. On the second and fourth days the patient received one blood unit each day because of low hemoglobin level (min. 6.2 g/dl). The Redon tubes drained summarily 300 ml of lightly blood-colored fluid on the first day. The drained volume decreased continuously to 50 ml on day 10.

On day 11, drainage rose to 575 ml and to 1360 ml on day 12. Analysis revealed a specific gravity of 1.015, pH 5, leukocytes 500/µl, erythrocytes 25/µl, rich squamous epithelial cells, glucose 300 mg/dl, no ketonic bodies or nitrocompounds, as well as a sodium concentration of 118 mmol/l, potassium 15.33 mmol/l, chlorides 92 mmol/l, urea 63.2 mmol/l, and creatinine 41.4 mg/dl. Cystography followed and revealed a normal bladder with smooth walls. No contrast medium leakage or JJ-stent shadow intensification were seen (Fig. 1, 2). Taken together, these results suggested that the drained fluid is urine and led to the conclusion that no ureteroneocystostomy existed.

Reoperation was on the following day. Intraoperatively, the distal end of the JJ-catheter lay loosely in the perivesical space, while the stented graft ureter was attached to the bladder wall but had no contact with the bladder's interior. The distal part of the ureter was cut off and a ureteroneoocystostomy was performed and the ureter stented with a JJ-catheter.

The postoperative follow-up was unremarkable. The transplanted kidney functioned properly and the patient did not require any more hemodialyses. She was discharged in good general condition on the 28th day after transplant and the 15th after reoperation. The reason for this complication was assumed to be a technical error during primary anastomosis, where no clear visibility of the bladder was obtained.

Case 2

A 30-year-old woman underwent renal transplantation in March 2002. End-stage renal disease, diabetes nephropathy, was caused by type 1 diabetes which she had had since she was four years old. Five years before the kidney transplant she started hemodialyses. During pretransplant qualification, laboratory findings and specialist consultations revealed diabetes retinopathy with considerable bilateral vision loss, arterial hypertension, and secondary anemia not requiring blood transfusions. Virusology for HIV, HAV, HBV, and HCV was negative. In her childhood she underwent appendectomy.

The transplant procedure was carried out classically into the right iliac fossa. The kidney was recovered from a 52-year-old deceased donor. The donor was 0 Rh positive with the HLA antigens A 3,30, B 7,21, DR 7,8 and the recipient was A Rh negative with the HLA antigens A 10, B 7,18, DR 4,8. Cold hypoperfusion time totaled 23 hours and warm 35 minutes. Ureteroneocystostomy was performed according to the modified Gregoir method (described below) and the ureter was stented with a JJ-stent. Two drains were placed.

Postoperatively the patient was administered cyclosporine A, mofetil mycophenolate, and methylprednisolone followed by prednisolone, ranitidine, trymetoprim/sulfometoxazole, ceftazidime, and verapamil. Intravenous neutral insulin was administered perioperatively and after the 11th day neutral insulin and isophane subcutaneously totaling 44 units/day. Because of posttransplant acute renal insufficiency, the graft did not regain its function and diuresis did not exceed 200 ml/day. Drain tubes were removed on the eighth day. Hemodialysis was performed daily until the seventh day, then every other day. Graft biopsy was performed and repeated on the 16th day because of suspected acute graft rejection. Histology revealed no aberrancies, but the patient's general state started worsening and ascites developed.

USG revealed a large collection of fluid around the transplanted kidney, with accompanying peritoneal fluid. During cystoscopy, no distal end of the JJ-catheter in the bladder was found. Reoperation was carried out as an urgent procedure on the 23rd day posttransplant. Intraoperationally, the transplanted kidney's JJ-catheterized ureter was found lying loosely in the retroperitoneal space without any contact with the bladder wall. Ureteroneocystostomy was performed again and the ureter was stented with a JJ-catheter.

The patient was discharged in good general condition on the 44th day posttransplant and the 20th after reoperation. The reason for this complication was assumed to be a technical error during anastomosis time, where no clear visibility of the bladder was obtained.

DISCUSSION

Urological complications are noted in 4.2-15.5% of kidney transplant recipients, depending on the definition and experience of the transplant institution. They can cause graft loss or even patient death [2-6]. Early diagnosis of most urological complications in patients with anuria is difficult. Because of this, catching the moment when the kidney starts functioning is of prime significance in the postoperative care of patients with posttransplant acute renal insufficiency. This is when early urological complications such as ureteroneocystostomy leak, its improper creation, or distal ureter necrosis manifest. In these cases the recipients' general condition often worsens unexpectedly because of urine collection in the perivesical space and, in many cases, accompanying infection and pelvic pain. In patients with draining tubes, the most common manifestation is a sudden increase in drained volume.

In both presented patients, symptoms of urine leakage to the perivesical space were observed. Radiologic (USG, cystography), biochemical (concentrations of sodium, potassium, urea, and creatinine in the drained fluid), and endoscopic (cystostopy) investigations allowed for fast diagnosis and aggressive treatment. In both cases a lack of the distal end of the JJ-stent in the bladder was noted which led to a suspicion of major ureterovesical anastomosis pathology confirmed during reoperation. Lack of a connection between the urinal tracts was effectively discovered thanks to cystograpy in the first and to cystoscopy in the second case.

Our technique of ureteroneocystostomy is a modified Gregoire approach. The difference between the original and the so-called Gregoire-Stolarczyk method lies in ureter fixation to the bladder. In the original method the ureter is fixed with two single distal sutures that go through the whole thickness of the bladder wall. In our method the ureter is fixed with three sutures, i.e. one single suture on the distal end (according to the original method) and two running sutures between the edges of the detubularized ureter and bladder mucosa so that the whole circumference of the end of ureter is fixed to the bladder mucosa. Afterwards, the incision is closed over the ureter with interrupted sutures, as in the original method. This method is in our opinion less prone to mechanical stress.

To avoid some anastomotic complications, we introduced a modification of the Vienna General Hospital (University of Vienna) method in 1998. In short, before ureter implantation the bladder is filled with sterile saline marked by Betadine. When the place for implantation is selected and the bladder wall incised, the outflow of orange-brown solution from the incised bladder wall confirms that the interior has been properly reached. After introducing this modification, the number of complications decreased, but not to zero, as shown by the presented cases.

CONCLUSIONS

The described complication is very rare. To our knowledge this is the first description of such cases. The exact mechanism is unknown, although probably similar in both cases. While the most common cause of urine leakage in kidney transplant recipients is ureteroneocystostomy leak, the possibility of the lack of any junction between ureter and bladder should be taken into account during evaluation. Cystoscopy and cystography, which can be quickly performed and are not cumbersome to the patient, allow for fast and reliable diagnosis before reoperation. Surgical revision of ureteroneocystostomy is faster and the probability of transplanted kidney rescue higher.

REFERENCES

1. Humar A, Mata AJ: *Surgical complications after kidney transplantation.* Semin Dial 2005; 18; 505-510.
2. Streeter EH, Little DM, Cranston DW, Morris PJ: *The urologic complications of renal transplantation: a series of 1535 patients.* BJU Int 2002; 90; 627-634.
3. Dinckan A, Tekin A, Turkyilmaz S et al: *Early and late urological complications corrected surgically following renal transplantation.* Transplant Int 2007; 20; 702-707.
4. Praz V, Leisinger H-J, Pascual M, Jichlinski P: *Urological complications in renal transplantation from cadaveric donor grafts: a retrospective analysis of 20 years.* Urol Int 2005; 75; 144-149.
5. Mäkisalo H, Eklund B, Salmela K et al: *Urological complications after 2084 consecutive kidney transplantations.* Transplant Proc 1997; 29; 152-153.
6. Rigg KM, Proud G, Taylor RM: *Urological complications following renal transplantation.* A study of 1016 consecutive transplants from a single center. Transplant Int 1994; 7; 120-126.

Correspondence
Krzysztof Tupikowski
Klinika Urologii i Onkologii Urologicznej
ul. Borowska 213
50-556 Wrocław, Poland
phone: +48 71 733 10 10
tupik@epf.pl