



Delayed Urinary Fistula after Kidney Transplantation: A Case Report

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Abstract

Introduction: Urological complications after renal transplantation are one of the main causes of patient morbi-mortality and delayed recovery of renal graft function. Urinary fistula is a rare urological complication that occurs early after renal transplantation and may lead to graft loss and patient's death. Here, there is a report that we have made to the observation of a patient with a delayed urinary fistula after renal transplantation. **Observation:** This was a 60-year-old male patient, with kidney failure due to undetermined nephropathy. He has developed urine leakage 30 days after renal transplantation caused by ischaemic necrosis of the distal ureter, treated surgically with a good outcome. **Conclusion:** The prevention of surgical complications of transplantation requires careful preparation of the transplant, and strict adherence to good surgical practice.

Subject Areas

Nephrology

Keywords

Urinary Fistula, Renal Transplantation, Ureteral Necrosis

1. Introduction

Kidney transplantation (KT) currently represents a better alternative to chronic dialysis. It improves patients' quality of life and ensures better survival. The indications for KT are becoming increasingly broad thanks to better management of immunosuppressive therapy, medical and surgical complications [1] [2].

However, despite improvements in surgical techniques in recent years, urological complications remain one of the main causes of patient morbi-mortality [1]. Urinary fistula is a rare and early urological complication of KT, affecting only 2% - 5% of cases and may lead to graft loss and patient death [1] [2].

The numerous anatomical variations in ureteral vascularization are probably the main factor explaining this complication, with some types of vascularization being more vulnerable than others. After removal of the drain, the urinary fistula might represent a painful collection around the graft, associated with a break in diuresis and an increase in creatinemia. Endoscopic treatment is indicated first, but surgery is sometimes unavoidable and may be associated with more serious complications [1]-[3].

We report a patient with a delayed urinary fistula after KT, secondary to ureteral necrosis, who has been successfully treated surgically with a good outcome.

2. Observation

This is a 60-year-old patient with chronic end-stage renal failure on undetermined nephropathy. He has been on chronic haemodialysis for over 20 years and was anuric, he received a kidney transplant from his 54-year-old wife, who shared 2 human leukocyte antigen (HLA) identities.

Immunologically, the patient was already transfused with packed red blood cells, he has not been transplanted previously, and HLA antibodies were negative in 4 serum. Both the recipient and the donor were immune to cytomegalovirus, and the donor's polymerase chain reaction (PCR) was negative.

The left kidney was harvested laparoscopically, using an artery and a vein. The technique of "Lich-Gregoir" was applied for the ureterovesical anastomosis on a small bladder, and diuresis was immediate when the artery was unclamped.

Immunosuppression was with Thymoglobulin induction followed by tacrolimus, mycophenolic acid and prednisone. There was prompt graft function with good urine output and a falling serum creatinine. Bladder catheter removal was removed within 7 days of transplantation, with failure of double J stent removal after 21 days, related to a wire that passed through the double J stent, blood creatinine was 88 $\mu\text{mol/L}$. A second attempt to remove the double J stent was scheduled in 1 month.

However, 30 days after KT, an increase in creatinine to 159 $\mu\text{mol/L}$ was associated with acute pyelonephritis due to *Klebsiella pneumoniae* and *Pseudomonas*, as well as urinary leakage through the wall. An ionogram on a sample of fluid from the surgical wound showed creatinine at 840 $\mu\text{mol/L}$, urea at 16.6 mmol/L, and potassium at 4 mEq/L. Abdominal MRI showed no urinary fistula. The patient was put on Colimycin for 14 days with insertion of a bladder catheter.

The bladder catheter was removed 2 weeks after the 2nd insertion, but urine was found to be leaking through the wall and the pyelonephritis recurred. The bladder catheter was therefore replaced and Meropenem-based antibiotic therapy was started for 21 days.

In addition, retrograde urethrocytography was performed, which showed a ureter partially disinserted from the bladder at the anastomosis, with leakage of iodinated contrast media from the ureterovesical anastomosis (**Figure 1**). Following these clinical and paraclinical examinations, the diagnosis of a urinary fistula due to distal ureteral necrosis has been retained. The patient underwent on a repeat surgery 4 months after KT, with resection of the necrotic part of the distal end of the ureter and uretero-vesical reimplantation using the Lich-Gregoir technique (**Figure 2**).

The bladder catheter was removed 1 month after the last repositioning, and the JJ stent was removed 6 weeks after the repeat surgery, after which the patient was put on Alpha Blockers.

Renal function improved and stabilised 6 years after KT, with serum creatinine at 106 $\mu\text{mol/L}$.



Figure 1. Retrograde urethrocytography showing perivesical extravasation of iodinated contrast media and an exposed double-J stent.

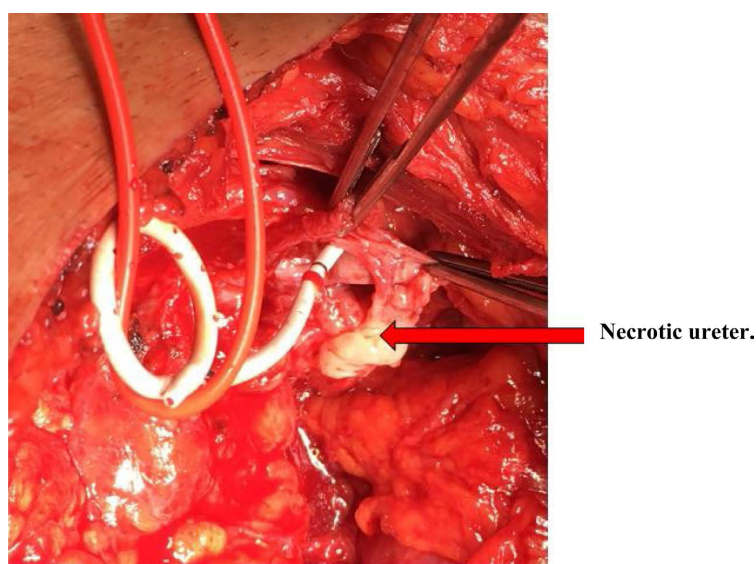


Figure 2. Ureterovesical reimplantation and removal of the necrotic ureter.

3. Discussion

Renal transplantation has become the treatment of choice in the management of end-stage renal disease. It has demonstrated its value in terms of improving the quality and length of life of patients, despite its medical and surgical complications. Prompt and appropriate management of these complications is a priority for nephrologists and transplant surgeons.

The main surgical complications are urinary, and represent one of the main causes of the patient's morbi-mortality, delayed function and graft loss. Urinary fistulas remain rare urological complications, occurring in 2% to 5% of cases [1] [2].

They may appear during the first day after surgery, mainly due to a technical accident at the time of surgery, but also at a later stage (1 - 2 weeks after surgery) secondary to ureteral necrosis [3].

Risk factors for the development of urinary fistulas include the age of the recipient, the number of arteries, the site of arterial anastomosis, the occurrence of rejection episodes, bladder dysfunction with its retraction secondary to the long duration of pre-transplant dialysis and the absence of residual diuresis, immunosuppressive regimen and cytomegalovirus infection [4] [5].

However, ureteral necrosis is the most frequent cause of urinary fistulas, accounting for 76.7% in the survey by Nie *et al.* [6]. It may be secondary to ureteral ischaemia favoured by the use of an excessively long ureter, thrombosis or ligation of an inferior polar arterial branch, or excessive dissection of periureteric tissue. Leakage at the pyeloureteral anastomosis may be linked to malposition of the double J stent. However, it often occurs without any obvious technical fault [6] [7].

The diagnosis of urinary fistulas is evoked by one of the following signs: discharge through the cutaneous orifice, excessive flow of drainage fluid in the early postoperative period, a decrease in diuresis, delayed graft function, pain over the graft or skin oedema, especially over the external genitalia, which is an almost pathognomonic sign [8] [9].

Ultrasound is a useful complementary examination in the diagnosis of urinary leakage. The ultrasound appearance is in the form of a well-defined anechogenic collection, without partitioning, unless infected or mixed with blood [8].

Ultrasound or injection-free CT scans are useful for investigating the presence of a laterovesical or perineal collection and possibly guiding puncture or drainage. Retrograde urethrocytography will show extravasation of the contrast product. An antero-contrast nephrostogram is performed if the patient has hydronephrosis, to locate the leak and determine its extent [10].

In our case, the diagnosis of urinary fistula was clinically evoked by the appearance of a discharge from the cutaneous orifice and confirmed by biological and radiological analysis.

Biological analysis of the fluid showed elevated creatinine and urea levels. Retrograde urethrocytography showed a ureter partially disinserted from the bladder at the level of the anastomosis, with a peri-anastomosis leak of iodinated contrast.

This urinary fistula is probably due to ischaemic necrosis of the distal ureter secondary to the uretero-vesical anastomosis on a small bladder retracted by the long duration of dialysis and possibly secondary to the first traumatic attempt to remove the double J catheter.

Once the diagnosis of urinary fistula has been established, immediate treatment will be essential. Urinary diversion, with or without primary repair, should be considered as a matter of urgency. Failure to provide adequate management will result in sepsis, with the risk of loss of the renal graft or death of the recipient. This management often consists of inserting a ureteral catheter. Early surgical revision should be discussed with ureteral reimplantation or pyeloureteral anastomosis with the native ureter, depending on local conditions. Numerous options have been described, with varying success rates: terminal ureteroureterostomy, ureteroneocystostomy, pyeloureterostomy, protected by a double J stent, percutaneous nephrostomy associated with a ureteral stent and prolonged bladder drainage [9] [11].

Surgery for urinary fistula should, at best, be performed within the first 3 weeks because thereafter, chronic urinoma favours the development of fibrosis and distant repeat surgery is complicated surgery at risk of injury to the vascular pedicle of the transplant [9] [12].

Our patient was treated surgically 4 months after renal transplantation with resection of the necrotic part of the distal end of the ureter and uretero-vesical reimplantation protected by a double J catheter, with good clinical progress and an improvement in blood creatinine.

Prevention of urinary fistula involves respecting all the arterial branches and especially the lower polars, respecting the cellular tissue around the ureter and the 'golden triangle' at the lower pole of the kidney, using the shortest possible ureter, and rigorous preparation of the transplant and the transplant itself. Thus the bladder must be of sufficient capacity, and compliant [9].

Some teams propose the use of a ureteral stent to slightly reduce the risk of urinary fistula and to make up for minor technical errors or very limited necrosis of the ureter, but with the risk of an increase in infectious complications originating in the urinary tract [13]. The Cochrane database meta-analysis demonstrated a significant reduction in the risk of urinary fistula with the insertion of a ureteral stent (RR 0.29, IC 95% [0.12 - 0.74], $p = 0.009$) [14].

4. Conclusions

Ureteral necrosis is the most common cause of urinary fistula. Therapeutic management of ureteral fistula often consists placement of a ureteral catheter. Re-operation for re-implantation uretero- or pyelo-ureteral anastomosis is often necessary. The surgical technique is the one most mastered by the transplantation team, taking into accounts the type of anastomosis, the location of the fistula and the type of vascularisation of the ureter.

However, the prevention of urinary fistula requires early detection and treatment

before surgery of a retracted bladder secondary to the long duration of dialysis, meticulous preparation of the renal graft with a good uretero-vesical anastomosis while strictly respecting good surgical practices.

Conflicts of Interest

The authors declare no conflicts of interest.

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