Urologic Complication Rates in Kidney Transplantation after a Novel Ureteral Reimplantation Technique

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Our transplantation team has performed 1615 renal transplantations since 1975. After September 2003, we began a corner-saving technique for urinary tract continuity. In this study, we analyzed these 174 renal transplantations retrospectively. The mean recipient age was 31.6 years (range, 7 to 66). The mean donor age was 39.8 years (range, 6 to 67). For ureteral reimplantation, a running suture is started 3 mm ahead of the middle of the posterior wall and is finished 3 mm afterward. After the last stitch, both ends of the suture material are pulled, and the posterior wall of the ureter and bladder are approximated tightly. The anterior wall is sewn either with the same suture or another running suture. Since using this technique, we have not employed a double-J or any other stent to prevent ureteral complications at the anastomosis site. We have seen only 4 (2.2%) ureteral complications (2 ureteral stenosis and 2 anastomotic leaks) during a follow-up period of 18.9 months. In conclusion, due to the low complication rate, we believe that our new technique is the safest way to perform a ureteroneocystostomy.

Key words: *Kidney transplantation, Ureteroneocystostomy, Corner-saving anastomosis technique, Outcome*

Urologic complications associated with the ureterovesical anastomosis after transplantation may cause graft loss and mortality [1]. Today, extravesical ureteroneocystostomy has become a popular procedure to reestablish urinary tract continuity in renal transplantation. Complication rates vary from around 20% to less than 5% [2, 3]. At many transplantation centers, surgeons have adopted new suture techniques. Several preventive measures have been added to this technique to prevent urologic complications [3]. To avoid urologic complications, clinicians at some transplant centers routinely prefer stenting, [4] for this maneuver avoids anastomotic tension, kinking, and ureteral narrowing. At our center, we have used a corner-saving ureteral reimplantation technique for renal transplantation since September 2003. Technical details were reported previously [5]. In this study, we present the outcome of our first 174 patients who had a ureteral reimplantation with the corner-saving technique without stenting.

Materials and Methods

Since 1975, our transplantation team has performed 1615 renal transplantations. From 1975 to 1983, we performed 300 ureteroneocystostomies using the modified Politano-Leadbetter technique. Beginning in 1983, we began using the extravesicular Lich-Gregoir technique in combination with temporary ureteral stenting (1141 patients). Then, in September 2003, we began using the corner-saving technique.

Before suturing, the posterior wall of the ureter is spatulated, and in the corner-saving technique, ureteral reimplantation is performed with a running 6-0 monofilament polydioxanone suture—a running suture that begins 3 mm ahead of the middle of the posterior walls of the ureter and bladder and finishes 3mm afterward. After the last stitch, both ends of the suture material are pulled to decrease the excess, and the posterior walls of the ureter and bladder are approximated tightly. The anterior wall is sewn either with the same suture or with another running suture. One hundred seventy-four renal transplantations have been performed with this technique. Since we have been using this technique, we have not used a double-J (DJS) or any other stent to prevent ureteral stenosis at the anastomosis site. In this study, we

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analyzed the patients' demographic characteristics, rejection rates, postoperative complication rates, and biopsy results, as well as ultrasonographic and scintigraphic findings. The maintenance immunosuppressive regimen consisted of cyclosporine, mycophenolate mofetil, and prednisone. For cadavering transplantations, induction therapy with daclizumab was initiated intraoperatively. Two doses of daclizumab (1 mg/kg) were used on days zero and 4.

Results

Since September 2003, we have performed 174 renal transplantations (130 living-related, 44 cadavering) on 129 men and 45 women with a mean age of 31.6 ± 10.9 years (range, 7 to 63 years). The mean donor age was 39.8 ± 12.8 years. We observed only 4 (2.2%) ureteral complications: two ureteral stenoses and 2 anastomotic leaks. In 2 patients with ureteral stenosis, we placed a nephroureterocystostomy catheter after performing balloon dilatation. In 2 patients, the ureteral leakage was treated by inserting a percutaneous nephrostomy catheter. Both patients healed with no complications. The mean follow-up was 18.9 ± 5 months (range, 1 to 32 months).

Regarding the ultrasonographic findings on days 3 and 7 after transplantation, there were 10 (5.7%) instances of minimal pelvicaliceal dilation, and renal scintigraphy revealed minimal urinary stasis in 22 (12.6%) patients. Urinary tract infections occurred in 4 (2.2%) patients. The mean creatinine levels on day 7 and at 1 month posttransplantation were 1.5 ± 0.7 mg/dL and 1.3 ± 0.5 mg/dL, respectively. During the early postoperative period, a renal biopsy was performed when a patient's creatinine level was elevated or remained high for 3 days. We performed renal biopsies in 25 (14.3%) patients. The results of these biopsies revealed tubuloepithelial injury in 8 patients and acute rejection in 17 patients. All except 1 episode of acute rejection responded to steroid therapy. The steroid-resistant case was treated with 14 doses of antithymocyte globulin.

Discussion

Compared with the modified Politano-Leadbetter technique, the extravesicular Lich-Gregoir technique is technically easier and faster to perform after renal transplantation. Its widespread adoption appears to have lowered urologic complication rates to below 5% [6]. In the last 174 cases, we changed our suture technique but continued to perform extravesical ureteroneocystostomy. In this technique, a mucosa-to-mucosa anastomosis should be performed with both the ureter and the bladder mucosa in clear view. Our new technique provides better visualization of both mucosas, simplifies suture placement in the posterior walls, and provides better identification of the lumen of the ureter. After the posterior walls have been approximated, it is also easy to complete the anastomosis with the same suture. These advantages clearly make this anastomosis superior with regard to preventing technical errors.

The overall incidence of urologic complications in our series was 2.2%, which was comparable to those reported by other major centers [2, 3, 7, 8]. Our urologic complication rate using the 4-quadrant suture technique was 2.9% [9]. Using this technique, our urologic complication rate decreased to 2.2%. In the four-quadrant technique, to prevent inadvertent suturing of the lumen or the hydronephrosis that sometimes occurs owing to anastomotic stenosis, we used either a temporary stent while placing the posterior row of running sutures or we used a DJS. Since applying this new technique, however, we have not used either temporary or permanent catheters. This technique allows us to perform each stitch under direct vision and makes it possible to safely anastomose ureters of very small caliber.

The incidences of urinary leakage in the different transplant centers ranged from zero % to 8.9% [7], and the incidences of ureteric stricture were reported to range from zero% to 12.4% [7]. In our series, 2 (1.1%) urinary leakages, and 2 (1.1%) distal ureteral stenoses were observed. These complication rates were similar to those in other series. All of them were treated with interventional radiologic techniques.

The use of ureteral stents in renal transplantation is still controversial. Recently, it was reported that routine use of the DJS prevented ureteral complications after kidney transplantation [6, 10]. However, other surgeons have reported that routine ureteric stenting is unnecessary for patients at low risk for urologic complications [11]. It must be kept in mind that refinement of surgical techniques and the introduction of new immunosuppressive protocols have also decreased the incidence of urologic complications [12].

To evaluate renal function, we investigated ultrasonographic and scintigraphic findings on days 3 and 7 and creatinine levels on day 7 and at 1 month after transplantation. All these parameters revealed good graft function both within the early postoperative period and at 1 month after transplantation. It is important to create a large enough anastomosis to maintain good flow. Edema in the ureterovesical anastomosis may cause ureteral stasis, which may retard the decrease in creatinine levels. In these cases,

creatinine levels decrease quickly. We concluded that this anastomosis technique allows for good urine excretion.

In conclusion, our technique enables the surgeon to place stitches under direct vision, which allows good urine excretion. Therefore, it was not necessary to use stents. We believe that its low complication rates, our technique—the corner-saving suture technique—is the safest way to perform an ureteroneocystostomy.

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