Optimal Timing for Removal of the Double-J Stent After Kidney Transplantation

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ABSTRACT

Background. Urologic complications (UC) have gradually decreased in recent years after advanced surgical experience. The incidence of urologic complications varies between 0.22% and 30% in different medical studies. There is no routine usage of double-J stenting (DJS) during renal transplantation (RT) in the literature. It is a necessity, and optimal timing for stent removal is an important question for many transplantation centers.

Methods. This study includes 818 renal transplant patients whose ureteroneocystostomy anastomoses were completed by use of the Lich-Gregorie procedure during a 2-year period at a transplantation center. We performed 926 renal transplantations at Antalya Medical Park Hospital Renal Transplantation Center between January 2014 and January 2016. The patients were divided into four groups according to the timing of DJS removal.

Results. For group 1, removal time for DJS was between 5 and 7 days; group 2, Removal time for DJS was between 8 and 14 days; group 3, removal time for DJS was between 15 and 21 days; and group 4, removal time for DJS was later than 22 days. The patients were divided into two groups according to removal time of stent as 5 to 14 days and >15 days. DJS was performed again in the patients whose urine output was reduced during the first 5 days after removal of the DJS, whose creatine level increased, and whose graft ureter and collecting tubules were extended as an ultrasonographic finding.

Conclusions. There is no declared optimal time for the removal of DJS. The removal time was reported between postoperative first week and 3 months in some of the reports of RT centers, according to their protocols. We emphasize that the optimal time for the removal of DJS is 14 to 21 days after RT, based on the findings of our large case report study.

RENAL transplantation (RT) is the most effective and definitive therapy for end-stage renal failure [1]. Surgical parts of RT are vascular and urologic anastomoses [2]. Urologic complications (UC) have gradually decreased in recent years after advanced surgical experience [2]. The incidence of UC varies between 0.22% and 30% in medical reports [3–6]. The double-J stent (DJS) is commonly used after ureteroneosistostomy during RT [4–8]. The DJS reduces the strain of ureterovesical anastomosis, ureteral kinking, and inversion while preventing stenosis caused by edema of the mucosa during the postoperative period [9,10]. The DJS can cause hematuria, irritation of the bladder, increased urinary tract infections, calcification caused by forgotten stent, disuria, suprapubic pain, and urinary incontinence [11,12].

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There is no routine usage of the DJS during RT in the literature. Its necessity and optimal timing for stent removal are important questions for many transplantation centers [4,8].

This study includes 818 renal transplant patients whose ureteroneocystostomy (UNC) anastomoses were completed by use of the Lich-Gregorie (LG) procedure during a 2-year period in a transplantation center.

METHODS

We performed 926 renal transplantations at Antalya Medical Park Hospital Renal Transplantation Center between January 2014 and January 2016. The exclution criteria included cadaveric transplantations, double collective urinary system, ureteroureterostomy application, and patients who had graft nephrectomy before stent removal. One hundred eight patients were excluded according to these exclution criteria. The same surgeon (S.T.) provided laparoscopic donor nephrectomy to all patients by use of the same method. During transplantation, UNC was performed by use of the DJS with the LG method, by the same surgeon (Y.Y.). Removal time of each DJS after RT was recorded.

The patients were divided into four groups according, to the timing of DJS removal: for group 1, the time of DJS removal was between 5 and 7 days; group 2, removal time for the DJS was between 8 and 14 days; group 3, removal time for the DJS was between 15 and 21 days; and group 4, removal time for the DJS was later 22 days.

The patients were divided into two groups according to removal time of stent as 5 to 14 days and >15 days. DJS was performed again in patients whose urine output was reduced during the first 5 days after removal of the DJS, whose creatine level increased and whose graft ureter and collecting tubules were extended as an ultrasonographic finding. UNC was performed by use of the LG method if a DJS could not beplaced. Urinary tract infections were confirmed by urine culture and antibiogram during this period. Local anesthesia was performed for removal of the DJS except for the pediatric population younger than 12 years of age, who required general anesthesia for this procedure. Immunsupression protocol included calcineurin inhibitors (tacrolimus-cyclosporine), mycofenolate mofetil, and corticosteroids. We routinely use tacrolimus as a calcineurin inhibitor in our center; in the case of side effects caused by tacrolimus, we use cyclosporine. Trimetoprime-sulfametacsazole was used for pneumocystis pneumonia carini prophylaxis. Introvenous seftriacton was administered to all patients for 5 days after renal transplantation. Nytrofurantain and ciprofloksasin for adult patients and oral sefiksim for patients under 18 years old were used for 5 days after hospital discharge.

Data were evaluated by use of the SPSS 16.0 program. Number, percentage, mean variation, Student t test, χ^2, Tukey honestly significant differeces (HSD), and Mann-Whitney U tests were used for data analysis.

Surgical Technique

After arterial and venous anastomosis, sistostomy was performed with the 1.5- to 2-cm insizyon from the top of the urinary bladder. The length of the ureter was measured after total evacuation of urine from the bladder, and aproximately 2 cm excess was cut for adapting to the insicion area ureter, which was checked again for kinking or turning before anastomosis was performed over the DJS with 6-0 absorbable polidiaksanon. Tunneling was performed with the use of 4-0 polygactin to provent refluxus during UNC.

The Urotech GmbH-Medi Globe Str. 1-5, 83101 (Achenmuhle, Germany) White Star' 4.7F, 15-cm DJS was implanted in all patients.

RESULTS

The study included 818 patients during the 2-year period; 545 patients were male (66.6%) and 273 patients were female (33.4%). The ages of patients were 3 to 76 years (mean, 41.8 ± 14.7). Mean body mass index (BMI) was 24.8 ± 5.1 kg/m^2 (13.4–52); tacrolimus dosage was 9.2 ± 1.7 μg/dL (6–17.6); and 12 (1.4%) patients were found to have urinary tract infections (UTI). The most common causes of chronic renal failure (CRF) were idiopathic (n = 180), type 2 diabetes mellitus (DM) (n = 90), type 1 DM (n = 15), hypertension (HT) (n = 105), and HT + DM (n = 37); 37 of the patients used cyclosporine because of tacrolimus side effects.

Group 1 consisted of 153 patients; 107 patients were male and 46 patients were female, with a mean age of 40.7 ± 13.9 years (10–72), mean BMI of 25.4 ± 4.5 kg/m^2 (13.4–36.5), and mean tacrolimus dosage of 9.4 ± 2.3 μg/dL (6.4–17.6). UTI observed in none of the patients. Common causes of CRF in this group were idiopathic in 52 patients, type 2 DM in 15 patients, type 1 DM in 1 patient, HT in 17 patients, and HT + DM in 8 patients. Six patients used cyclosporine because of the side effects of tacrolimus.

Group 2 consisted of 165 patients; 118 patients were male and 47 patients were female, with a mean age of 43.5 ± 15.8 years (6–71), mean BMI of 24.8 ± 4.8 kg/m^2 (14.6–52.8), and mean tacrolimus dosage of 9.7 ± 1.9 μg/dL (6.2–12.7). UTI was detected in 2 patients. Common causes of CRF in this group were idiopathic in 59 patients, type 2 DM in 23 patients, type 1 DM in 1 patient, HT in 20 patients, and HT + DM in 2 patients. Nine patients used cyclosporine because of the side effects of tacrolimus.

Group 3 consisted of 283 patients; 123 patients were male and 160 patients were female, with a mean age of 41.5 ± 14.7 years (3–47), mean BMI of 24.4 ± 4.9 kg/m^2 (14.2–36.8), and mean tacrolimus dosage of 9.0 ± 1.0 μg/dL (7.6–11.1). UTI was detected in 3 patients. Common causes of CRF in this group were idiopathic in 109 patients, type 2 DM in 31 patients, type 1 DM in 4 patients, HT in 35 patients, and HT + DM in 13 patients. Thirteen patients used cyclosporine because of the side effects of tacrolimus.

Group 4 consisted of 217 patients; 127 patients were male and 90 patients were female, with a mean age of 41.9 ± 15.2 years (15–42), mean BMI of 25.5 kg/m^2 ± 6.3 (15.3–42.7), and mean tacrolimus dosage of 9.1 ± 1.4 μg/dL (7.0–12.7). UTI was detected in 7 patients. Common causes of CRF in this group were idiopathic in 60 patients, type 2 DM in 21 patients, type 1 DM in 8 patients, HT in 33 patients, and HT + DM in 14 patients. Nine patients used cyclosporine because of the side effects of tacrolimus.

The procedures and timing of removal of the DJS are shown in Table 1. Comparison of the groups is shown in Table 2.