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Use of double J stent in kidney transplantation: a single-center cohort report

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Abstract. *Kidney transplantation is the treatment of choice for end-stage kidney disease. The double J stent is commonly used in kidney transplantation. The incidence of urologic complications varies between 0.22 % and 30 %. Ureteral strictures and urinary leakage are the most common urological complications after kidney transplantation. Use of the double J stent can decrease urological complications after kidney transplantation. However, the double J stent can increase urinary tract infections, suprapubic pain and urinary incontinence.*

This study aimed to evaluate the outcomes of the use of double J stent in kidney transplantation.

Methods. *Between April 2014 and April 2019 130 patients with the use of double J stent were studied retrospectively at Medipol University Medical Faculty Hospital Organ Transplantation Department, Istanbul, Turkey. In these patients, demographic features, clinical features and urologic complications were evaluated.*

Results. *The mean age of the patients was 38.3 ± 15.6 years. 84 (67 %) patients were males and 46 (33 %) were females. Mean follow-up was 29.1 ± 15 months. Mean double J stent removal time was 31.3 ± 2.2 days. During follow-up, there were no ureteral strictures and urinary leakage. Urinary infections were diagnosed in 5 (3.8 %) patients.*

Conclusions. *Use of double J stent appears to be successful to prevent the urological complications in kidney transplantation.*

Keywords: *double J stent, kidney transplantation, analysis.*

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Використання подвійного J-стену у реципієнтів ниркового трансплантату: звіт про когорту одного центру

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Резюме. Трансплантація нирок є методом вибору для лікування термінальної стадії хронічної хвороби нирок. Подвійний J стент зазвичай використовується під час трансплантації нирок. Частота урологічних ускладнень коливається в межах від 0,22% до 30%. Стрикттури уретри та підтікання сечі є найпоширенішими урологічними ускладнення після трансплантації нирок. Використання подвійного J стенту зменшує урологічні ускладнення, але водночас підвищує частоту інфекційних ускладнень, надлобкового болю та нетримання сечі.

Це дослідження мало на меті оцінити відділені результати використання подвійного J стенту під час трансплантації нирок.

Методи. У період з квітня 2014 по квітень 2019 року 130 пацієнтів із застосуванням подвійного J стенту, які лікувались у центрі трансплантації органів медичного факультету Медіпольського університету, Стамбул, Туреччина, були проаналізовані ретроспективно. Були оцінені демографічні особливості, клінічні особливості та урологічні ускладнення.

Результати. Серед включених у дослідження пацієнтів було 84 (67%) чоловіків та 46 (33%) жінок. Середній вік хворих становив $38,3 \pm 15,6$ років. Період спостереження склав $29,1 \pm 15$ місяців. Середня тривалість перебування подвійного J стенту становила $31,3 \pm 2,2$ днів. Під час спостереження не визначено жодного урологічного ускладнення: стриктури сечоводу або підтікання сечі. Розвиток інфекції сечової системи спостерігали у 5 (3,8%) пацієнтів.

Висновки. Використання подвійного J стенту є успішним для запобігання урологічних ускладнень під час трансплантації нирок.

Ключові слова: подвійний J-стент, трансплантація нирки, аналіз.

Introduction. Kidney transplantation is the treatment of choice for end-stage renal disease (ESRD) [1].

Surgical parts of kidney transplant are venous, arterial and urologic anastomoses. Ureteral strictures and urinary leakage are the most common urologic complications after kidney transplantation. The incidence of urologic complications varies between 0.22% and 30% [2-4].

The double J stent is usually used in kidney transplantation. Use of the double J stent can decrease urological complications in kidney transplantation (reduces the strain of ureterovesical anastomosis, ureteral kinking, and stenosis due to edema) [5]. However, the double J stent can increased urinary tract infections, suprapubic pain and urinary incontinence [6].

This study aimed to evaluate the outcomes of the use of double J stent in kidney transplantation.

Methods. It was a retrospective case-control study conducted between April 2014 and April 2019 at Medi-

pol University Medical Faculty Hospital Organ Transplantation Department, Istanbul, Turkey. 130 kidney transplant recipients with the use of double J stent were involved in the study. Clinical and laboratory data were retrieved from hospital files, information system and personal interviews.

Surgical Technique. All recipients underwent extravesical Lich-Gregoire ureteroneocystostomy. The ureter-to-mucosa anastomosis was performed using running 5–0 polidiaksanon, and the bladder muscle was closed with interrupted sutures of 5–0 polidiaksanon. Routine stenting received a double pigtail 4.8 French 15 centimeters (Urotech, Achenmuhle, Germany) ureteric stent, inserted after one side of the anastomosis was completed. A 20-French Foley catheter was routinely inserted intraoperatively and removed after 72 hours. The stent was removed between 28 and 35 postoperative days under local anesthesia.

Immunosuppression. All patients received quadruple sequential immunosuppression consisting of induction with antithymocyte globulin (ATG), followed by triple immunosuppressive therapy. All these patients were given ATG at the intraoperative period and continued its administration during 2 postoperative days. Calcineurin inhibitors (tacrolimus or cyclosporine) were used as standard immunosuppressive therapy. Mycophenolate Mofetil or Mycophenolate Sodium was

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prescribed during the first year. Prednisolone was used during the first third months.

Opportunistic Infection Prophylaxis. In our clinic, Valganciclovir in dose 900 milligrams (mg) per day for the first 100 days were prescribed to the patients for CMV prophylaxis. Sulfamethoxazole/trimethoprim was administered in a dose of 400 mg per day for Pneumocystis Pneumonia and urinary tract infection prophylaxis for 6 months. Moreover, they took Fluconazole 100 mg per day during the first 30 days for candida prevention.

All patients received a single preoperative dose of intravenous Cefuroxime (750 mg) and oral Ciprofloxacin (500 mg) two times daily for the first 5 days.

Patients were examined on weekly basis for the first month after discharge, on bi-weekly basis dur-

ing the second month, and monthly for the following months.

Statistical Analysis. SPSS 22.0 (SPSS for Windows, 2007, Chicago) was used for statistical analysis. Continuous variables with normal distribution were presented as mean \pm Standard deviation. The qualitative variables are demonstrated as percent (%).

Results. Among 130 kidneys transplant patients there were 84 (67%) males and 46 (33%) females with an average age at the time of transplantation of 38.3 ± 15.6 years. The most common causes of ESRD were diabetic nephropathy (32.3%) and hypertension (14.6%). The patients' demographic and clinical features are presented in Table 1.

Table 1

Demographic and clinical findings of the patients

Age (years)	38.3 \pm 15.6
Sex (Male / Female) (n /%)	84 (67%) / 46 (33%)
Body Mass Index (kg / m ²)	25.2 \pm 5.6
Preoperative creatinine levels (mg / dL)	7.1 \pm 1.5
Postoperative first month creatinine levels (mg / dL)	0.89 \pm 0.26
ESKD causes (n /%)	<ul style="list-style-type: none"> • Unknown 47 (36.2%) • Diabetes Mellitus 42 (32.3%) • Hypertension 19 (14.6%) • Chronic Glomerulonephritis 17 (13%) • Polycystic Kidney Disease 3 (2.4%) • Other 2 (1.5%)
Warm ischemia time (second)	90.5 \pm 21
Cold ischemia time (minute)	53.5 \pm 14
Preemptive transplantation (n /%)	27 (20.7%)
Double J stent removal period (days)	31.3 \pm 2.2
Follow-up period (month)	29.1 \pm 15
Urological Complications (n /%)	—
Urinary Tract Infections (n /%)	5 (3.8%)

As you can see in Table 1, throughout the study period there were 5/130 (3.8%) urinary tract infection episodes that resulted in oral antibacterial treatment and

there were no ureteral strictures and urinary leakage. Table 2 shows a comparison of our results with the other reported data.

Table 2

Comparison of our results with scientific literature results

	Double J Stent Removal Period (Days)	Urinary Complications Rate (%)	Urinary Infection Rate (%)
Dominguez et al [7]	7-10	3.5	6.9
Harza et al [8]	14	3.3	51.3
Our Study	28-35	-	3.8

Discussion. Surgical parts of kidney transplantation are a renal artery, renal vein and ureter anastomosis [9]. Ureteral strictures and urinary leakage are the most common urologic complications after kidney transplantation. The incidence of urologic complications varies between 0.22% and 30% [2-4]. Urological complications are associated with graft loss and kidney recipients' mortality [10].

The double-J stent is commonly used during ureteroneocystostomy in kidney transplantation [11]. The use of the double J stent can decrease urological complications (ureteral strictures and urinary leakage) in kidney transplantation [5]. It reduces the strain of ureterovesical anastomosis, ureteral kinking, and inversion while preventing stenosis caused by edema of the mucosa during the postoperative period [12]. In our clinic, we routinely use the double J stent in kidney transplantation.

Urological complications are mostly seen in the first 2 weeks after kidney transplantation. Therefore, the double J stent removal period is very important. It has been reported, that the best time of the double J stent removal is between 1 week and 3 months [13]. In our clinic, we routinely withdraw it between 28 and 35 days after kidney transplantation. In this study, there were no ureteral strictures and urinary leakage.

The double J stent can increase urinary tract infections, suprapubic pain and urinary incontinence [9]. Bacterial colonization to the double J stent plays an essential role in the stent-associated infections [12]. It has been demonstrated that the urinary tract infections rate varies between 6.9% and 71% in patients who had double J stent [4]. In this study, the urinary tract infections rate was 3.8% (5 patients). The reason for the minority of urinary tract infections in our patients may result from the usage of antibacterial agents until discharge from the hospital.

Our study has several limitations. First, this study was retrospective one performed in a single center. Second, a small sample size was analyzed for unequivocal conclusions.

Conclusions. The use of double J stent appears to be successful to prevent the urological complications in kidney transplantation. The larger scale studies are needed for further confirmation of our findings.

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Author contributions. GE and TY collected, analyzed, interpreted the data, and wrote the manuscript. All authors read and approved the final manuscript.

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