

ORIGINAL ARTICLE

Refluxing Versus Non-Refluxing Uretero-Vesical Anastomosis in Renal TransplantMUSHTAQ AHMAD¹, NASRUM MINALLAH¹, AHMAD NAWAZ¹, AKHTAR NAWAZ¹, TARIQ AHMAD¹, IKRAM ULLAH KHATTAK¹¹Department of Urology and Renal Transplant Institute of Kidney Diseases, Hayatabad Medical Complex Phase IV Hayatabad Peshawar.Corresponding author: Dr. Nasrum Minallah, Email: drnasrumminallah@gmail.com**ABSTRACT****Background:** Urinary tract infection and pyelonephritis are very common in patients with renal transplant. One of mechanism to prevent pyelonephritis is performing a non-refluxing anastomosis of ureter with bladder. Whether this procedure can decrease the rate of urinary tract infection and pyelonephritis is controversial.**Objective:** To assess the out-come of refluxing versus non-refluxing ureterovesical anastomosis in renal transplant recipients.**Study Design:** Randomized Control Trial (RCT)**Methodology:** This RCT was carried out in the Department of Urology and Renal Transplant, Institute of Kidney Diseases Hayatabad Medical Complex Peshawar from January 2015 to January 2020. A total of 52 patients who underwent live donor renal transplant were equally divided into two groups by block randomization, Group A-refluxing and Group B-non-refluxing ureterovesical anastomosis. Informed written consent was obtained from all patients. Each patient was followed for a period of one year and outcome parameters including frequency of anastomotic leakage, anastomotic stenosis, symptomatic UTI, hematuria and mean nadir creatinine level were recorded. The data were analyzed using SPSS version 26 using chi-square test for categorical data and T-test for numerical data keeping p-value < 0.05 as significant.**Results:** The mean age in group A and group B was 36.6 + 6.1 and 35 + 4.7 years respectively (p-value > 0.05). In group A, no patient developed anastomotic stenosis whereas in group B, 2 (7.7 %) patient developed anastomotic stenosis (p-value > 0.05). 1 (3.8 %) patient in group A developed anastomotic leakage while none of the patients in group B developed any leakage (p-value > 0.05). The mean nadir serum creatinine in group A was 1.3 + 0.4 mg/dl and 1.2 + 0.2 mg/dl in group B (p-value > 0.05). 4 (15.4%) of patients in group A and 3 (11.5%) of the patients in group B developed UTI (p-value > 0.05).**Practical Implication:** The refluxing ureterovesical anastomosis is relatively easier and less time consuming in comparison to the non-refluxing technique, since there is no statistical difference between their outcomes, the refluxing technique can be utilized in adult kidney transplant recipients.**Conclusion:** We concluded from this study that there is no statistically significant difference in the out-come between refluxing and non-refluxing ureterovesical anastomosis in renal transplant patients of adult age.**Keywords:** Lich-Gregoire, Renal Transplantation, Refluxing Ureterovesical anastomosis, Urine Leakage, UTI**INTRODUCTION**

Renal transplant is the standard treatment for selected patients with end stage renal disease (ESRD) beyond any doubt¹. It is a lengthy procedure so every step should be well-coordinated. Unnecessary steps should be avoided. One of the controversies is regarding type of ureterovesical anastomosis that whether it should be refluxing or non-refluxing. The advantages of refluxing extravascular anastomosis include short operative time, less chance of hematuria, lesser bladder spasm, easy to construct and less chance of ureterovesical junction stenosis. The disadvantage is the reflux of urine to the transplanted kidney^{2,3}.

There is no consensus about the effect vesicoureteral reflux (VUR) of urine on early and late allograft function and allograft survival. Studies published about 2 decades ago implicated VUR as a major factor in late renal graft failure⁴. However, recent evidence shows that VUR has no negative impact on graft function or graft survival rate. Renal function and graft survival does not differ between patients with or without post-transplant VUR^{5,6}. A non-refluxing ureterovesical anastomosis is important in children with growing kidneys. Once the kidneys have developed, reflux does not affect the kidney function. Female adults with a history of childhood VUR have increased rate of urinary tract infection (UTI) and pyelonephritis during pregnancy and sexual life but it is still not clear that reflux in a well-developed adult kidney without previous history of VUR will affect it or not⁷. However, most authorities believe that VUR has not a harmful effect once the kidney has normally developed without any previous scar⁸.

We conducted this study to assess the out-come of the refluxing and non-refluxing ureterovesical anastomosis in live donor renal transplantation.

MATERIAL AND METHODS

This RCT was carried out after approval from the hospital ethical committee, at the Department of Urology and Renal Transplant, Institute of Kidney Diseases Hayatabad Medical Complex Peshawar from January 2015 to January 2020.

Population: The study population included adult live donor kidney transplant recipients.**Sampling:** The study sampling technique was consecutive non-probability technique. All adult patients who underwent live donor kidney transplant were included in the study. Patients with history of lower urinary tract dysfunction, neurogenic bladder and history of lower urinary tract surgery were excluded from the study. Informed written consent was obtained from all patients.**Sample Size:** A total of 52 patients who underwent live donor renal transplant were equally divided into two groups by block randomization, Group A-refluxing and Group B-non-refluxing ureterovesical anastomosis. The non-refluxing anastomosis was performed by modified Lich-Gregoir method while refluxing anastomosis by simple mucosa to mucosa anastomosis without submucosal tunnel.**Data Collection Procedure:** Each patient was followed for a period of one year and outcome parameters including frequency of anastomotic leakage, anastomotic stenosis, symptomatic UTI with proven urinary culture and mean nadir creatinine level were recorded.**Data Analysis Plan:** The data were analyzed using SPSS version 26 using chi-square test for categorical data and T-test for numerical data keeping p-value < 0.05 as significant.**RESULTS**

The number of patients included in the study was 52, 26 in each group. The mean age in group A and group B was 36.6 + 6.1 and 35 + 4.7 years (p-value > 0.05). In group A, 19 (73.1%) were males and 7 (26.9%) were females whereas in group B, 17 (65.4%) were males and 9 (34.6%) were females (p-value > 0.05). In group A, no patient developed anastomotic stenosis whereas in group B, 2 (7.7 %) patient developed anastomotic stenosis (p-value > 0.05). 1 (3.8 %) patient in group A developed anastomotic leakage while none of the patients in group B developed any leakage (p-value > 0.05). The mean nadir serum creatinine in group A was 1.3 + 0.4 mg/dl and 1.2 + 0.2 mg/dl in group B (p-value > 0.05). 4 (15.4%) of

patients in group A and 3 (11.5%) of the patients in group B developed UTI (p-value > 0.05). None of the patient in both groups developed any significant hematuria that might need transfusion or intervention. These results are shown in table 1.

Table 1: Comparison of Refluxing and Non-refluxing Ureterovesical Anastomosis

Parameters	Total	Group A	Group B	P-Value
n	52	26	26	-
Age (years)	35.9 + 5.4	36.6 + 6.1	35.2 + 4.7	0.35
Gender				
Male	36 (69.2%)	19 (73.1%)	17 (65.4%)	0.55
Female	16 (30.8%)	7 (26.9%)	9 (34.6%)	
Anastomotic Stenosis	2 (3.8%)	0 (0%)	2 (7.7%)	0.15
Anastomotic Leakage	1 (1.9%)	1 (3.8%)	0 (0%)	0.31
Nadir Creatinine (mg/dl)	2.2 + 0.4	1.3 + 0.4	1.2 + 0.2	0.80
Patients who had UTI	7 (13.5%)	4 (15.4%)	3 (11.5%)	0.68
Hematuria requiring transfusion	0 (0%)	0 (0%)	0 (0%)	-

UTI-urinary tract infection

DISCUSSION

The ureterovesical anastomosis is considered one of the most important aspects of renal transplant. There is no consensus regarding the type of ureterovesical anastomosis in renal transplant patients⁹. However the choice is usually made between refluxing (full-thickness) and anti-refluxing (i.e., Lich-Gregoir) techniques of ureteroneocystostomy. Current study is comparing the outcomes of these two techniques in renal transplant recipients. The overall urological complication rate after renal transplantation is 1–15%¹⁰⁻¹². The complication rate in our study was 19.2%.

The incidence of urine leakage in renal transplant recipients is 1.5-8.9%¹⁰. It may result from technical error in ureterovesical anastomosis or ischemic necrosis of the distal segment of the re-implanted ureter. Treatment options include urethral catheterization, percutaneous nephrostomy, antegrade or retrograde double-J stent placement and open surgical approaches such as ureteral reimplantation or pyeloureterostomy with the native ureter¹³⁻¹⁵. In this study urine leakage was observed in 1.9% of the patients (3.8% in Refluxing vs 0% in Non-refluxing group). However the difference between the groups in terms of frequency of urine leakage was not statistically significant. The patient became dry with long term (2 weeks) urethral catheterization.

The incidence of ureterovesical anastomotic stenosis is 2-13% following renal transplantation¹⁶⁻¹⁸. It may be attributed to poor surgical technique and ureteral devascularization in the early post-operative period¹⁹. In the late period it is due to primary scarring or fibrosis of the ureter, most often due to devascularization or BK polyomavirus infection²⁰. Treatment options include balloon dilation, ureterovesical junction resection, double-J stenting, metallic stenting, endoureterotomy and ureter reimplantation^{18,21}. In this study anastomotic stenosis was observed 3.8% of the patients (0% in Refluxing vs 7.7% in Non-refluxing group). However the difference between the groups in terms of frequency of anastomotic stenosis was not statistically significant. These anastomotic stenoses were managed with balloon dilation and double-J stenting.

The overall prevalence of urinary tract infection in patients with renal transplant ranges widely from 14.9% to 34.2%^{22,23}. In this study the overall frequency of UTI was 13.5% (15.5% in Refluxing vs 11.5% in Non-refluxing group). However the difference between the groups in terms of frequency of UTI was not statistically significant.

One of the complications of ureterovesical anastomosis is hematuria, reported around 15% in literature²⁴. We considered any hematuria significant which could need transfusion or causing clot retention requiring cystoscopy. No such complication was observed in our study.

Kyle et al. evaluated urologic complications in over 600 patients comparing refluxing (full-thickness) and anti-refluxing (i.e., Lich-Gregoir) technique of anastomosis. They reported that there

was no difference between groups in terms of complication rates, allograft survival, patient survival, length of stay, and incidence of UTI during the first year after transplant²⁵. We also found no difference between refluxing and non-refluxing ureterovesical anastomosis with respect to frequency of urinary leakage, anastomotic stenosis and UTI.

The limitations of our study may include small sample size and short follow up.

CONCLUSION

The overall result of refluxing ureterovesical anastomosis has no significant effect on the out-come of renal transplant when comparing it with non-refluxing anastomosis. However more studies are needed with a large sample size with a long duration of follow up.

Conflict of Interest: Authors declare that they have no conflict of interest.

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Ethical Approval: The authors declare that this research has been approved from the Institutional Research and Ethical Board IREB, constituted by the Board of Governor Hayatabad Medical Complex as governing authority for Institute of Kidney Disease Hayatabad Peshawar government of Khyber Pakhtunkhwa Health Department.

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