The outcomes of transurethral incision/resection of the prostate (TUIP/TURP) performed early after renal transplantation

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ABSTRACT

Objective: In the early period after renal transplantation, urinary retention stemming from bladder outlet obstruction (BOO) may directly affect graft success. The aim of this study was to evaluate the early and long-term outcomes of transurethral resection of the prostate (TURP) and transurethral incision of prostate (TUIP) procedures performed in the first month following RT due to BOO.

Material and methods: Between February 2009 and March 2016, 38 male patients underwent TURP/TUIP due to BOO within the first 30 days of renal transplantation. The urodynamic and renal function assessment results of all patients were collected during the pre- and postoperative periods. All patients were followed up for a minimum of 12 months for short and long-term complications. The results were evaluated retrospectively.

Results: The mean age of the patients who underwent operations was 59.2±12 years. The median duration of dialysis was 41 months (range 0-180). Before the operation the mean serum creatinine (sCr) level was 1.8±0.7 mg/dL, the mean total PSA level was 1.6±1.1 ng/mL. Of the voiding parameters, the mean Qmax and Qave were measured as 8.2±4.5 mL/sec and 4.6±2.5 mL/sec, respectively. The median post-micturition residual urine (PMR) was 105 mL (range 10-400). TURP/TUIP operations were performed at a median of 19 days (range 8-30) after renal transplantations. None of the patients experienced major complications. In the early postoperative period, 5 patients (13.1%) developed urinary tract infection. The mean decrease in sCr in the first month following TURP/TUIP was 1.4±0.4 mg/dL (p<0.001). The mean Qmax (22.4±11.1 mL/sec), and Qave (11.7±5.4 mL/sec) increased significantly (p<0.001), while the median PMR (15 mL, range 0-205) decreased significantly (p<0.001). The mean follow-up period after the procedure was 46.8±23.3 months. During the follow-up period, 3 (7.8%) patients suffered from urethral stricture and 2 (5.2%) patients from bladder neck obstruction.

Conclusion: In the surgical treatment of urinary retention arising from BOO in the first month following renal transplantation, TURP/TUIP yield safe and successful results. In addition, regarding the short and long term outcomes, these procedures may be safely performed with low morbidity.

Keywords: Prostate; renal transplantation; TUIP; TURP.

Introduction

Renal transplantation (RT) is the best treatment modality which increases quality of life, and overall survival in old patients with end-stage renal failure.[1] Urological complications developed after RT are importance causes of morbidity, and mortality. Accordingly, they may prolong duration of hospitalization, and require additional surgical intervention. [2] Urinary retention due to bladder outlet obstruction (BOO) is an important urological problem which may be especially encountered in men older than 50 years within the short-, or long-term after RT. BOO may develop due to bladder neck obstruction (BNO) or benign prostatic hyperplasia (BPH). Early treatment, and diagnosis of BOO occurring in the lower urinary tract is very important for the maintenance of graft functions.[3] Transurethral resection of the prostate (TURP), and transurethral incision of the prostate (TUIP) are the most
prevailently performed surgical methods for the surgical management of BOO.\[3\] Although scarce number of articles have investigated BOO emerging after RT, investigators recommend treatment soon after RT.\[5-7\] Nevertheless, inadequate literature data exist concerning short-, and long-term urological outcomes of TURP, and TUIP performed especially within the first 30 days after RT. The objective of this study is retrospective evaluation of the outcomes of TURP, and TUIP performed for the relief of urinary retention developed secondary to BOO within the short term after RT.

**Material and methods**

A total of 2358 male patients underwent RT in our hospital between February 2009, and March 2016. Standard surgical RT technique was applied for all patients. During operation ureteral catheterizations were performed for all patients. Postoperatively a standard immunosuppressive protocol consisting of mycophenolate mofetil, a calcineurin inhibitor, and steroid treatment was initiated. Urethral catheters were removed within postoperative 5-7 days, unless cystograms did not reveal any evidence of extravasation. Then postmictional residual urine (PMR) was measured. After removal of the catheter the patients who could not urinate or had serious lower urinary tract symptoms (LUTS) underwent detailed physical examination, transrectal ultrasound, and uroflowmetric examinations. In case of need the patients were evaluated with flexible cystoscopy. In the light of the results obtained, the patients with advanced LUTS were catheterized via urethral route, and these patients were scheduled for surgery. The patients with moderate-advanced stage LUTS were catheterized using indwelling urethral Foley catheters, and then medical treatment with alpha-blockers were initiated (alfuzosin, tamsulosin). Five days later Foley catheter was withdrawn, uroflowmetry, and measurement of PMR were repeated. Surgery was planned for the patient whose voiding parameters did not improve. Preoperatively urine cultures of all patients were obtained, and surgery was performed after sterilization of urine.

Finally, between February 2009, and March 2016, TURP/TUIP operations were performed for 38 male patients because of urinary retention due to BOO within the first month after RT. The decision of TURP or TUIP was made in consideration of patient’s age, prostate volume, and risk of retrograde ejaculation. Surgeries were performed under spinal or general anesthesia. Thirty minutes before the operation, as a prophylaxis, treatment with a cephalosporin was initiated, and maintained postoperatively for 24 hours. Just before the surgery urethral catheters were removed, and they were not re-inserted after the surgery. TURP/TUIP surgeries were performed by 4 different surgeons. TURP operation was performed using standard technique, and continuous flow 26 Fr bipolar resectoscope. In consideration of de novo anastomosis, resection was performed with irrigation under hydrostatic pressure as low as possible. Samples were collected to analyze prostate pathology, and to calculate amount of resected tissue. For TUIP surgery Orandi’s technique was used, and prostate, and bladder neck was incised at 5, and 7 o’clock positions using Collins knife. After TURP/TUIP surgeries an 18 Fr or 20 Fr 3-way Foley catheter was inserted. Irrigation was maintained for postoperative 24 hours. Catheters were withdrawn between 1-4 days after normalization of urine based on the type of surgery (TUIP or TURP) performed. During postoperative period urine cultures, serum creatinine (sCr), and PMR measurements were repeated.

At postoperative 1., and 6. months, sCr, complete urinalysis, urine culture, uroflowmetry, and PMR were evaluated. At postoperative 6. month, one patient died because of non-urological etiologies, so his follow-up was terminated. All patients were followed up for at least 12 months as for outcomes of surgery together with long-term complications including urethral stricture, and bladder neck contracture due to TURP/TUIP.

The study was planned retrospectively. Pre-, and postoperative outcomes were compared. For this study, ethics committee approval was obtained from Antalya Medical Park Hospital Complex Ethics Committee, and this manuscript was written in compliance with Helsinki Declaration. Written informed consent forms were obtained preoperatively from all patients.

**Statistical analysis**

For statistical analysis, IBM SPSS (IBM Statistical Package for the Social Sciences; Armonk, NY, ABD) 22 for Windows program was used. For parameters with normal distribution Kolmogorov-Smirnov or Shapiro-Wilk tests were used. Continuous variables were expressed as mean ± standard deviation (SD). For parameters with non-normal distribution Wilcoxon Signed-Rank test was used, and expressed as median (minimum-maximum) values. For intergroup comparisons during pre-, and postoperative periods paired T test was used. P values less than 0.05 was accepted as statistically significant.

**Results**

A total of 38 (1.6%) renal transplant patients with BOO who were scheduled for surgical treatment underwent TURP (n=31) or TUIP (n=7). Mean age of the patients was 59.2±12 years, median duration of dialysis before RT was 41 (0-180 months) months. Median prostate volume measured with the aid of TRUS was 29 (15-82) cm³. Preoperatively mean sCr level was 1.8±0.7 mg/dL, and mean total PSA was 1.6±1.1 mg/dL. Mean values for uroflowmetric parameters were as follows: Qmax: 8.2±4.5 mL/s; Qave 4.6±2.5 mL/s, and PMR, 105 (10-400) mL. TURP/TUIP surgeries were performed on
median post-transplantation 19 (8-30 days) days. None of the patients required blood transfusion during postoperative period. Median weight of the resected prostate tissue of 31 patients who underwent TURP was 9 (1-55 gr), and histopathological diagnosis of all of these patients was BPH. Postoperatively urethral catheter remained in situ for a mean period of 2.3±0.8 days. During postoperative period urinary tract infection (UTI) was seen in 5 (13.1%) patients. Clinically UTIs were presented with asymptomatic bacteriuria. Body temperature did not increase above 38 oC. In all these patients antibiotherapy achieved complete cure. After removal of urethral catheter PMR was measured. Acute urinary retention developed in only two (5.25%) patients. Clean-catch intermittent catheterization was initiated for these patients. Urinary incontinence was not seen in any patient during postoperative period. At 1. month after TURP/TUIP mean serum creatinine level dropped significantly down to 1.4±0.4 mg/dL (p<0.001). Among voiding parameters mean Qmax (22.4±11.1 mL/s) (p<0.001), and Qave (11.7±5.4 mL/s) (p<0.001) increased significantly, while median PMR (15 ml ;0-205) decreased significantly (p<0.001) (Table 1). The patients were postoperatively followed up for a mean period of 46.8±23.3 months. During long-term follow-ups the effects of surgeries still persisted. As long-term complications, urethral stricture (n=3; 7.8%) (post- TURP, n=2, and post-TUIP, n=1) developed within a median period of 12 (1-35) months after the operation, and bladder neck contracture was formed in 2 (5.2%) patients after a median period of 36 (29-42 months) months (Table 2).

### Discussion

Nowadays we know that optimal medical treatment is required so as to be able to talk about a successful RT. Optimal bladder function is another important requirement.[8] After RT, urine flow increases, and preexisting BPH or BOO may cause urinary retention.[9] Urinary retention is the most predominant symptom of BOO. In cases with urinary retention, increased intravesical pressure due to contractions of detrusor muscle affects graft function adversely. This condition may cause ureterovesical anastomotic leak or serious infections via ureteral route especially during early post-transplantation period. Medical, and surgical treatment alternatives are available. Alpha-blockers constitute the first medical treatment alternative. Alpha-blockers may be beneficial in mild, and moderate LUTS. In addition, especially initiation of alpha-blocker treatment before RT for patients diagnosed as BPH has been reported to decrease symptoms of LUTS developed after RT.[10] However it is quiet difficult to detect appropriate patient group. It should be known that it is very difficult to predict incidence of BPH because of dialysis-dependent oliguric or anuric life span.[11] When the outcomes of end-stage renal failure patients who had undergone TURP with the diagnosis of BPH before transplantation were evaluated, oliguric, and anuric state of these patients were observed to be a high risk for the postoperative development of bladder neck stricture.[12] Therefore, it has been suggested that surgeries should be deferred after transplantation in patients diagnosed as BPH irrespective of their oliguric or anuric state before transplantation because of higher incidence of postoperative morbidity.[13]

TUIP is an alternative method in lieu of TURP in the surgical treatment of BNO. In urology guidelines, especially in cases with small-sized prostates (<30 cm³), and in patients where the risk of postoperative retrograde ejaculation should be taken into consideration, TUIP is recommended.[14,15] Abd-El Kader et al.[16] prospectively compared recently performed cases who had undergone TUIP, and TURP, and found similarly effective outcomes for both methods carried out for prostates weighing ≤30 gr.

### Table 1. Variations in urodynamic test results, and serum creatinine values

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>p</th>
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<tbody>
<tr>
<td>Q max, mL/s</td>
<td>8.2±4.5</td>
<td>22.4±11.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Q ave, mL/s</td>
<td>4.6±2.5</td>
<td>11.7±5.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PMR, mL</td>
<td>105 (10-400)</td>
<td>15 (0-205)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>sCr, mg/dL</td>
<td>1.8±0.7</td>
<td>1.4±0.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Qmax: maximum urine flow rate; Qave: mean urine flow rate; PMR: postmicturitional residual urine; sCr: serum creatinine

### Table 2. TURP/TUIP complications

<table>
<thead>
<tr>
<th>Postoperative complications</th>
<th>%</th>
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<tbody>
<tr>
<td>Short term</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>13.1</td>
</tr>
<tr>
<td>Acute urinary retention</td>
<td>5.2</td>
</tr>
<tr>
<td>Long term</td>
<td></td>
</tr>
<tr>
<td>Urethral stricture</td>
<td>7.8</td>
</tr>
<tr>
<td>Bladder neck contracture</td>
<td>5.2</td>
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</table>

TURP: transurethral resection of the prostate; TUIP: transurethral incision of the prostate
the patients was 59.2 years. We also think that RT performed for patients aged above 50 carries a risk for urinary retention. As is known, long-term dependency on dialysis, oliguric or anuric life may cause bladder dysfunction.[17] In our study, during TURP mean weight of the resected prostate specimen, and preoperative mean prostate volume was 29 cm³. When outcomes of post-transplantation TURP were evaluated, similar to our study results, Gratzké et al.[29] detected preoperative prostate volume as 25 cm³, and median weight of prostate tissue resected was 10 gr. In both of these studies it appears that decreased amount of prostate tissue was resected during TURP, when compared with TURPs performed in general population. In urinary retention developed secondary to BNO during early post-transplantation period, only BPH should not be taken into account. This condition may be caused by functional stricture of the bladder neck developed due to anuric or oliguric state secondary to prolonged dialysis therapy. Mokos et al.[7] evaluated the outcomes of TURP/TUIP surgeries performed during the first month following RT in 24 patients who had been under dialysis therapy for a median of 7.43 years, and based on cystoscopic assessments they found BNO in 9, and BPH in 15 patients with a median age of 52 years. Markić et al.[18] reported successful management of female patients who developed BNO after RT performed after nearly 3 years of dialysis therapy. When we reviewed the results of abovementioned studies successful recovery of these patients with TURP/TUIP has striken our attention whether or not BNO is induced by BPH or BNO.

Post-TURP/TUIP bacteremia is an important postoperative complication. In immunosuppressive patients who underwent RT, bacteremia may very easily lead to septic complications. This condition may result in graft loss or even death of a patient. Reinberg et al.[20] reported a case of mortality among 8 patients with a median age of 62 years due to candida sepsis during early post-TURP period. Therefore the state of ureteral catheter is debatable in TURP/TUIP surgeries performed during early post-transplantation period. Reinberg et al.[20] recommended removal of the ureteral catheter before TURP, and its reinsertion during postoperative period in case of need. We may probably made this recommendation so as to protect the patients from catheter-related renal graft infection. We withdrew ureteral catheters of all patients before we proceeded with TURP/TUIP. However we didn’t feel the need to reinsert ureteral catheter during postoperative period. Nevertheless we detected UTI in 13.1% of the patients during postoperative period. In literature reviews the incidence of post-TURP UTI is 4.1% (0-22).[19] UTI detected in this study did not affect graft survival in any patient. However, Mokos et al.[7] reported that they retained the ureteral catheter in situ during TURP/TUIP operations they performed within the first 30 days after transplantations without subsequent development of any postoperative complication. Only in a study by Mokos et al.[7] the authors did not share any information about the incidence of postoperative UTI in their study. In another study Piovesan et al.[20] found incidence of UTI after TURP operations performed within the first 2 months after RT as 75 percent. However in this study any information about the state of ureteral catheter was not provided. Therefore we think that further large series concerning the state of ureteral catheters inserted during TURP/TUIP operations carried out within the early period after RT will provide guidance on this issue.

Another surgical risk during early post TURP/TUIP period which should be paid attention is jeopardizing ureterovesical anastomosis performed during RT. In this study preoperative cystograms of the patients were obtained. Any anastomotic leak was not observed, so the patients were operated. During operation, irrigation under low pressure, and complete hemostasis so as to prevent development of clot retention were performed, and every measure was taken not to disrupt ureterovesical anastomosis. In this study, in none of these patients any complication which affected de novo ureterovesical anastomosis during postoperative period occurred.

The probability of observing urethral stricture which is one of the late-term complications developing after TURP ranges between 2.2, and 9.8 percent.[21] Urethral mucosa rupture occurring during transurethral interventions has been found to be a major risk factor for the formation of urethral stricture. Herein, loss of mucosal integrity, and related subepithelial extravasation of urine with resultant inflammation induce development of scar tissue, and therefore stricture.[22] In our study, postoperative development of urethral stricture at 12., and bladder neck contracture at 36. months suggests that urethral stricture may develop at 12. month of the postoperative follow-up period, and bladder neck obstruction years later.

Bladder neck contracture is also one of the other long-term complications of TURP. In the literature the incidence of post-TURP bladder neck contracture has been reported to range between 0.3, and 9.2 percent.[23] It has been more frequently observed following resections of small-sized prostates.[24] Therefore one should be more attentive when making indication of TURP for small-sized prostates.[25] The authors have indicated that bladder neck incision performed at the end of TURP may decrease the risk of development of bladder neck contracture.[26] In our study, when one considers that median volume of resected prostates was 29 cm³, then median incidence rate of contracture was 5.2% which is within an acceptable range.

In conclusion, urinary retention due to BOO emerging after RT may create problems which may directly affect the success...
rates of RT. This condition should be accurately, and rapidly treated. In the surgical management of the patients who did not benefit from medical treatment, TURP and TUIP are successful treatment modalities. When postoperative short-, and long-term complications are taken into consideration, TURP and TUIP can be safely performed within the first 30 days following RT.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Antalya Medical Park Hospital (No:001/2017).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.


Conflict of Interest: No conflict of interest was declared by the authors.

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