

## Morbidity and early outcome of transurethral resection of prostate: A prospective single-institute evaluation of 100 patients

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### Abstract

**Background:** Transurethral resection of the prostate underwent significant technical improvements during the last decades, with major impact on the incidence of intra and postoperative complications.

**Objectives:** The objective of the study was to analyse the early complications and to predict immediate outcomes of transurethral resection of prostate (TURP) in a single tertiary care institute.

**Materials and methods:** We prospectively evaluated 100 patients undergoing transurethral resection of prostate at B and B Hospital, Gwarko, Lalitpur, Nepal, from August 2008 till April 2009. Case records containing 32 variables concerning preoperative status, operative details, complications and immediate outcome were recorded for each patient.

**Results:** The cumulative short-term postoperative significant morbidity was 10% and the perioperative morbidity was 6%. The most relevant postoperative complication was failure to void (24%). Among significant postoperative morbidities, surgical revision had to be performed in two patients (2%), open prostatectomy in one patient, transurethral resection (TUR) syndrome in 5% and significant urinary tract infection in 2%. Among significant intra operative morbidity, we had one case with bladder perforation, significant cardiac arrhythmia requiring prompt attention in 4% and TUR syndrome during resection in 1%. We did not have any mortality related to the procedure during the study period. The resected tissue averaged 25.67gm. Incidental carcinoma of the prostate was diagnosed by histological examination in 4% of patients. Urine peak flow rate (Q-max) increased to 12.88ml per second from 9.24ml per second and average flow rate increased to 7.36 ml per second from 5.03 ml per second. The postoperative mean residual urine measured by ultrasound decreased to 28.46ml from preoperative 86.59 ml.

**Conclusions:** TURP has, for decades, been the standard surgical therapy for lower urinary tract symptoms secondary to benign prostatic hyperplasia though significant morbidities can be associated with the procedure. Meticulous preoperative workup and proper selection of the patients for the procedure significantly improve the outcome after transurethral resection of the prostate.

**Key words:** TURP ( Transurethral resection of prostate), LUTS ( Lower urinary tract symptoms), BOO (Bladder outlet obstruction)

Despite the introduction of alternative techniques, TURP still remains the gold standard in the surgical management of benign prostatic enlargement. Transurethral resection of the prostate underwent significant technical improvements during the last decades, with major impact on the incidence of intra and postoperative complications. It has been shown that one third of the men with Lower Urinary Tract Symptoms (LUTS) do not have Bladder Outlet Obstruction (BOO) and 5-35% of the patients with LUTS do not have improvement in symptoms after TURP<sup>1</sup>.

### Materials and methods:

Data of hundred men who underwent TURP for LUTS, between August 2008 till April 2009 were prospectively analysed. The descriptive statistics of the patients are summarised in table 1. The patients were thoroughly

worked-up prior to intervention. Apart from routine investigations, all patients underwent uroflowmetry evaluation and suprapubic ultrasonography including measurement of post-void residual urine. Prostate specific antigen was routinely sent in all the patients who were subjected to TURP. Urine culture and sensitivity study was done in every patient and associated co-morbidities were further evaluated in order to optimize their status for intervention.

Transurethral resection of the prostate was performed under spinal anaesthesia (71%) in majority of the cases,

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followed by general anaesthesia (24%) in some and even caudal anaesthesia (5%) in the very few who had uncontrolled co-morbid conditions. Glycine 1.2% was used for irrigation during the procedure. Total resection time, weight of the chips resected and any intraoperative incidences were recorded. Three-way Foley's catheter, 24F size, was inserted in all the patients and normal saline irrigation was started. Foley's traction was applied in selected patients depending upon the state of urine drainage and it was usually taken out 4-6 hours postoperatively.

Serum creatinine, serum sodium and haemoglobin were routinely sent immediately from the postoperative ward and were interpreted accordingly. Postoperative normal saline irrigation was stopped early in the morning next day. Then, a first trial without catheter (TWOC) was performed in the third postoperative day. Patients were taught Kegel's exercise from the first postoperative day and were encouraged to ambulate. Fluid output charting was maintained on the day of first TWOC while uroflowmetry evaluation was performed in the evening of TWOC. In patients who were unable to void satisfactorily, 14 F Foleys catheter was introduced and they were discharged with the advice to follow-up after a week, for the second TWOC. Patients who successfully voided were followed up after a week of discharge and histopathology reports were discussed with the patients.

## Results

Average age of the patients who underwent TURP was 66.9 years with average flow rate at uroflowmetry evaluation of 5.03ml/sec. The mean maximum flow (Q max) was 9.24ml/sec. The average size of the prostate or prostatic volume (PV) was 38.34 gms with the mean post void residual urine volume (PVR) of 86.59ml. The mean Prostate specific antigen (PSA) was 3.62ng/ml. The mean size of the prostate on digital rectal examination (DRE) was 31.30 gms.

Forty percent of the patients developed some form of complications, which also included failure to void on the third postoperative day. Twenty percent of patients could not void after the first trial of catheter removal and catheter had to be reintroduced back again. All the patients with failed first TWOC were discharged

with catheter in situ and were followed up after a week. However, all patients in the study passed urine successfully, eventually. Six patients developed TUR syndrome; it was recognized intraoperatively in one patient while the rest were noted within 24 hours of surgery. All of them were tackled successfully. Four patients developed some form of cardiac arrhythmia that had to be dealt with promptly on the operation table and all of them were successfully managed. In one patient, while attempting resection, there was profuse bleeding from the prostatic bed into the bladder occluding vision despite vigorous bladder wash-out. We promptly decided to perform open retropubic prostatectomy. Ultimately, he had uneventful preoperative and postoperative period. We had one extra-vesical bladder perforation while performing TURP. It was promptly recognised during the procedure and indwelling catheter was kept for two weeks. There were two cases of established urosepsis which were managed conservatively with broad spectrum antibiotics.

The study by Heilbronn et al<sup>2</sup> had shown postoperative infection rate to be 1.7% which was very much comparable with our study. Quite a significant number of patients (6%) who manifested features of TUR syndrome in our study were due to the reasons that we had included all those who developed very mild features of TUR syndrome. Kunz et al<sup>3</sup> had very reasonable complications rate in comparison to the rest of the studies mentioned in table 3, however, infections(4%) seem to be quite high in the series. Muzzonigro et al<sup>4</sup> had the highest rate of postoperative transfusion rate whereas Kunz et al had the least transfusion rate.

The average resection speed is comparable with other studies mentioned in table 4, however, the average weight of the prostate in the study was 25.68 gms with the total resection time being 41.90 minutes.

Histopathology of the resected chip revealed adenocarcinoma in 4% of the patients and prostatic intraepithelial neoplasia (PIN) in two patients. To our surprise, the youngest patients was 35 years of age who presented with features of acute retention of urine with a huge prostate; histopathology of the resected specimen revealed leiomyoma of the prostate. We had to perform a formal open retropubic prostatectomy on him.

**Table 1: Descriptive statistics of preoperative parameters**

	Age(yrs)	Q max	Average-flow	PV	DRE	PVR	PSA
Mean	66.92	9.24	5.03	38.34	31.30	86.59	3.62
Standard deviation	9.04	3.19	2.06	21.20	16.43	56.81	2.30

**Table 2: Incidence of intraoperative(I/O) and early postoperative(P/O) complications**

Type of complications	I/O complications	Early P/O complications
Cardiac arrhythmia	4	-
TUR syndrome	1	5
Extra Peritoneal Bladder perforation	1	-
Surgical revision	-	2
Open prostatectomy	1	-
Urosepsis		2
Failure to void on 3 <sup>rd</sup> postoperative day	-	24
Incontinence		-
Mortality	-	-

**Table 3: Main early postoperative complications after TURP: data comparison.**

Authors	Number	Transfusion (%)	Revision (%)	Infections	TUR syndrome
Heilbronn 2003	126	4.8	4.2	1.7	0.8
Kunz 2004	100	2.0	3.0	4.0	0.0
Muzzonigro 2004	113	7.1	Na	Na	0.0
Our study	100	6	2	2	6.0

**Table 4: Weight and resection speed: Data comparisons.**

Authors	Number	Weight (gm)	OR time (mins)	Resection speed (g/min)
Heilbronn 2003	126	47.9	77.0	0.6
Kunz 2004	100	37.2	73.8	0.5
Muzzonigro 2004	113	31.0	52.5	0.6
Our study	100	25.67	41.90	0.6

**Table 5: Histopathology of the specimen.**

Histopathology of the specimen	100 (%)
PIN+ nodular hyperplasia	2
Hyperplasia +acute prostatitis	6
Hyperplasia +chronic prostatitis	13
Benign prostatic hyperplasia	6
Leiomyoma+hyperplasia	1
Nodular hyperplasia+ chronic prostatitis	34
Nodular hyperplasia	34
Adenocarcinoma	4

## Discussion

It is accepted that benign prostatic hyperplasia is one of the most common disease in elderly men. Transurethral resection of prostate is the reference standard surgical treatment. Although it is an effective modality, TURP has considerable morbidity and its overall cost per year is also significant. For this reason, to minimize unnecessary interventions, predicting the outcome of TURP is crucial. Many variables are available, such as prostatic volume, post-void residual volume, transitional zone and volume index, urodynamics and uroflowmetry studies, have been evaluated to predict the

outcome of TURP<sup>5</sup>. We have tried to evaluate patients with various parameters prior to TURP and observed the outcomes after the procedure.

In a separate study, Venrooij et al compared the outcome of TURP in urodynamically obstructed versus urodynamically unobstructed or selected equivocal patients. They concluded that TURP could be a good treatment alternative for selected equivocal or unobstructed patients who opt for resection, did not benefit from medical therapy and as requirement for

treatment discontinuation. They also added that TURP can significantly reduce urethral resistance even in unobstructed men<sup>6</sup>.

However, Javle et al reported a sensitivity of 71%, specificity of 74% and positive predictive value of 81% using a simplified normogram to grade obstruction. The values were raised to 87% sensitivity, 97% specificity and 95% positive predictive value when used in conjunction with detrusor contractility to predict the outcome of TURP<sup>7</sup>. Although urodynamic study is not more morbid than venous puncture, the discomfort of the procedure is considerable and not all centers have facilities for that.

Contemporary reviews and audits of 379 patients conducted by Reynard JM and Shearer RJ revealed that there was not a significant difference in age between those who voided successfully and those who did not and all patients with LUTS voided successfully following TURP. The proportion of men failing to void after TURP was significantly higher in those with chronic retention compared to acute retention. There were not significant differences in resected weight in the successful voiders versus non-successful group<sup>8</sup>.

Failure to void after TURP is reported in 0.5-11% of patients<sup>9</sup>. In the Mebust's series, 2.4% of patients were discharged with an indwelling foley's catheter. The most common cause for this was thought to be hypotonic bladder<sup>10</sup>. In our series, 24% of the patients could not void satisfactorily, hence they had to be recatheterized. Among them, 80% (18) successfully voided on the first or second day after recatheterization. Most of the patients with unsuccessful first TWOC (trial without catheter) had relatively larger size (70% of them had prostate larger than 40gms) of prostate and were on foley's catheterization (65% of the 24 patients) prior to surgery. All our patients ultimately voided satisfactorily within a week of recatheterization and had normal uroflowmetry pattern.

In a series of 90 patients older than 80 years of age undergoing TURP, Wyatt et al<sup>11</sup> reported failure to void on initial TWOC in 27%. Most of the patients in this series had acute, chronic or acute on chronic retention. Eleven patients were ultimately treated with permanent indwelling catheter. The relative chance of recatheterisation according to the mode of presentation was not mentioned.

Similarly in the UK national prostatectomy audit, Pikard et al<sup>12</sup> reported failure to void in 9.2% of men with acute retention compared with only 2.3% of those undergoing prostatectomy for LUTS. After prostatectomy in those with acute retention, 0.9% required a permanent

indwelling catheter compared with 0.1% of those with LUTS.

Djavan et al<sup>13</sup> concluded that age older than 80, retention volume greater than 1500ml, and low maximal detrusor pressure were significant predictive factors for unsuccessful outcome and counseled against offering prostatectomy to such patients.

### Conclusion

Despite the introduction of many minimally invasive techniques, TURP still remains the gold standard in the surgical management of benign prostatic enlargement. Failure to void on first TWOC after TURP is not an uncommon condition. In this series, failure of first TWOC on the third post-operative day occurred in 24%, however, all of them voided satisfactorily within a week of recatheterization. Patients with relatively larger prostate and those who were catheterized prior to the procedure had significant impact on successful first trial without catheter. Such patients should be warned regarding high chance of failure to void after TURP though most of them ultimately tend to void successfully.

Proper selection of the patients is the key to successful voiding after TURP and every effort has to be made at ruling out any underlying local and general neurological abnormalities. Selective urodynamic studies would be appropriate for suspected underlying neurologic components. Uroflowmetry studies definitely help proper evaluation of the patients prior to intervention and for an objective evaluation of the outcome.

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