



## Morbidity and early outcome of transurethral resection of prostate (TURP): A retrospective, single-institute study

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### ABSTRACT

**Background:** Transurethral resection of the prostate (TURP) is one of the most frequently performed surgery by the urologists. Most of the patients belong to the elderly population with significant co-morbidities like coronary artery disease, COPD, Diabetes mellitus, Hypertension etc, which accentuates the peri- and post-operative complications. TURP has undergone 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 analyze co-morbidities of the patient population undergoing TURP, the peri-operative complications and early post-operative complications TURP in a single tertiary care institute.

**Materials and methods:** We retrospectively evaluated 416 patients underwent transurethral resection of prostate in our institution from November 2014 to November 2016. Case records containing 32 variables on co-morbidities, operative details, peri-operative complications and early post operative complications were recorded for each patient.

**Results:** The cumulative short-term postoperative significant morbidity was 17.5%. The most relevant postoperative complication was urinary tract infection (7.5%). Among significant postoperative morbidities, surgical revision had to be performed in for patients (2%) and transurethral resection (TUR) syndrome in 1.4%. We did not have any mortality related to the procedure during the study period. The resected tissue averaged 28.8gm. Incidental carcinoma of the prostate was diagnosed by histological examination in 3.14% of patients.

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

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

### 1. Introduction

Despite the introduction of alternative techniques, TURP still considered the gold standard in the surgical management of benign prostatic hyperplasia (BPH). TURP underwent significant improvements during the last decades, including instruments, operative techniques, video-endoscopy, anesthesia care, intra-operative monitoring of fluid and electrolyte balance etc, with a major impact on the incidence of intra and postoperative complications.

### 2. Aim of the Study

- To assess / stratify the co-morbid medical conditions in TURP candidates.
- To find out the rate of peri-operative / early post operative complications of TURP.

### 3. Materials and methods:

Data of 416 men who underwent TURP for various indications according to AUA guidelines, between November 2014 and November 2016 were retrospectively analyzed. The inpatient and outpatient records, operation registers, investigation and histopathology reports and discharge summaries were analyzed.

The patients with previous prostate surgeries, patients with stricture disease, patients with neurologic problems, patients with clinical or biochemical evidence of prostate cancer, patients with simultaneous bladder cancer were excluded from the study.

The patients were thoroughly worked-up prior to intervention. All routine investigations like Hemoglobin, Complete blood count; Renal Function Tests, Blood Sugar, ECG and Chest X-ray were taken in all patients. All patients underwent, Transabdominal ultrasonography including measurement of post-void residual urine, Prostate specific antigen (PSA) and Urine culture and sensitivity. Uroflowmetry was done in selected cases only. Associated co morbidities like Diabetes Mellitus, Hypertension, COPD, Coronary Artery disease, Renal Failure, Liver disorders etc were further evaluated to optimize their status for intervention.

All the patients were given with Cefaperazone 1gm plus Sulbactam

500mg pre-operatively. TURP was performed under spinal anesthesia in majority of the cases, followed by general anesthesia. Distilled water was the irrigation fluid used for irrigation during the procedure in all the cases. The procedure was done with 26F, continuous flow resectoscope in all cases.

Total resection time, weight of the chips resected and any intraoperative incidences were recorded. 22F, Three-way Foley catheter was used in all the patients and normal saline for post-operative irrigation. Foley 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 Hemoglobin were routinely sent immediately in the postoperative period. Postoperative irrigation was stopped in the next day morning. The first trial without catheter was performed in the third postoperative day.

The following parameters were recorded:

- Mean age
- Co-morbidities
- Indications for TURP
- Resection time
- Resected tissue weight
- Pathological diagnosis
- Intra-operative / Early post-op complications
- Blood transfusions
- Catheter duration
- Hospital stay

In patients who were unable to void satisfactorily, 16 F Foleys catheter was introduced and they were discharged with the advice to follow up after a week, for the second trial voiding. Patients who successfully voided were followed up after 2 weeks of discharge and histopathology reports were recorded.

### 4. Results

#### 1. Age distribution

The mean age of the patients operated was 68.3 yrs (range 52 to

87years), and maximum number of patients belonged to the age group of 56 to 75 years

| Age group | No | %     |
|-----------|----|-------|
| < 50      | 0  | 0%    |
| 51 – 55   | 28 | 6.73  |
| 56 – 60   | 69 | 16.59 |
| 61 – 65   | 71 | 17.06 |
| 66 – 70   | 87 | 20.91 |
| 71 – 75   | 67 | 16.11 |
| 76 – 80   | 52 | 12.5  |
| 81 – 85   | 31 | 7.45  |
| 86 - 90   | 11 | 2.64  |
| > 90      | 0  | 0%    |

## 2. Co-morbidities

Hypertension was the most common co-morbid condition in our patients, which was present in 312 (75%) out of 416 patients, followed by Chronic obstructive pulmonary disease in 231 (55.53%) of patients. 92 patients (22.11%) patients didn't have any co-morbidities, Where as 324(77.88%) patients had one or more complications, of this, majority had a single co-morbid condition (73.46)

| Co-morbidity      | No  | %     |
|-------------------|-----|-------|
| Hypertension      | 312 | 75    |
| CAD               | 71  | 17.07 |
| COPD/ Asthma      | 231 | 55.53 |
| Diabetes Mellitus | 78  | 18.75 |
| Renal Failure     | 17  | 4.10  |
| CVA               | 2   | 0.48  |
| CLD               | 4   | 0.96  |

| co – morbidity | Prevalence   |
|----------------|--------------|
| None           | 92 (22.11%)  |
| One or more    | 324(77.88%)  |
| single         | 238 (73.46%) |
| > 1            | 86 (26.54%)  |

## 3. Preoperative Indications

In our study, refractory Acute urinary retention was the most common (279 patients, 67.06%) indication for TURP, followed by bothersome LUTS (116 patients, 27.88%) that was refractory to medical management.

43 (10.33%) Patients had concomitant removal of Vesical calculus, majority of these removed endoscopically but 3 required concomitant cystolithotomy.

83 (19.95%) had recurrent UTI, but that was not the single indication for TURP

| Indication      | No of patients | %     |
|-----------------|----------------|-------|
| Refractory AUR  | 279            | 67.06 |
| LUTS(IPSS> 20)  | 116            | 27.88 |
| Gross Hematuria | 13             | 3.15  |
| Azotemia        | 08             | 1.9   |

## 4. Prostate Volume.

The average size of the prostate or prostatic volume (PV) was 38.34 gms in ultrasonography with majority being grade I in DRE

| Prostate Volume(gm) | Number of patients | % |
|---------------------|--------------------|---|
| 20-30               | 36                 |   |
| 30-40               | 104                |   |
| 40-50               | 158                |   |
| 50-60               | 81                 |   |
| 60-70               | 21                 |   |
| 70-80               | 16                 |   |

## 5. Intra-operative assessment

The average resection time was 24.5 minutes (range 17 – 75 minutes) The average weight of resected specimen was 28.8 gms (range 15 – 48 gms)

## 6. Peri-operative complications

73 patients (17.5%) of the patients developed some form of complications.

16 (3.85%) patients could not void after the first trial of catheter removal and required re-catheterization. All the patients who failed on

first catheter removal were discharged with catheter in situ and were reviewed after one week. Of these 16 patients, 12 voided in the next trial voiding. The remaining 4 underwent cystoscopic evaluation and required re-resection of residual apical tissue, followed by successful trial voiding.

Six patients (1.4%) developed TUR syndrome intra-operatively. All of them were managed successfully.

Urinary tract infection was the most common complication, which was seen in 31 patients (7.5%), but no patients had evidence of urosepsis.

23 patients (5.5%) had bleeding with clot retention in the immediate postoperative period, out of this, three required re-coagulation for hemostasis, and the remaining could be managed conservatively.

29 patients (6.49%) of patients required blood transfusion intra-operatively or in the immediate post operative period.

7 patients (1.7%) patients developed urgency incontinence in the early post operative period.

| Complication            | No. of patients | %     |
|-------------------------|-----------------|-------|
| Bleeding - Transfusion  | 27              | 6.49% |
| Re-coagulation          | 3               | 0.7%  |
| Clot retention          | 23              | 5.53% |
| TUR Syndrome            | 6               | 1.4%  |
| UTI                     | 31              | 7.45% |
| Urosepsis               | 0               | 0%    |
| Failure to void         | 16              | 3.85% |
| Incontinence(Temporary) | 7               | 1.7   |

## 7. Non- TURP related complications

5 patients (1.2%) in our study group developed acute myocardial infarction either intra-operatively or in the early post-operative period. All of them could be managed successfully with the help of cardiologist. Three patients (0.72%) developed cerebrovascular attack in the peri-operative period. 23 patients (5.53%) developed acute exacerbation of COPD in the peri-operative period. 3 patients (0.72%) had worsening of their renal parameters following TURP.

| Complication              | No. of patients | %    |
|---------------------------|-----------------|------|
| A/C Myocardial Infarction | 5               | 1.20 |
| Hemiplegia                | 3               | 0.72 |
| Exacerbation of COPD      | 23              | 5.53 |
| Hepatic Failure           | 1               | 0.24 |
| ARF on CRF                | 3               | 0.72 |

## 8. Pathology Reports

96.88% of the surgical specimens were benign, where as in 13 (3.12%) cases HPR came as adenocarcinoma.

## Discussion

Benign prostatic hyperplasia (BPH) is one of the most common diseases in elderly men. Transurethral resection of prostate (TURP) is the standard surgical treatment. Even though it is a very effective mode for cure of the disease, it has considerable morbidity. The cost and need of infrastructure facility is another concern. For this reason, it is better to minimize unnecessary interventions.

We have tried to evaluate our patients with various parameters prior to TURP and observed the co-morbid conditions and morbidity outcomes after the procedure.

In a 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 [1]

Regarding the indication for TURP; LUTS, refractory to medical management was the most common in various studies (51 – 81%) [4]. Whereas, A/C urinary retention was the main indication in our study (67%). This may be probably due to reserving the surgical management for those patients with retention, due to the large volume of patient population.

The age group of patients undergoing TURP in our study was comparable with various other studies.

The weight of resected tissue was lesser in various studies 18.8 – 25.3gms, where as it is 28.8 gms in our study.

Resection time required is also less in our study (24.5 minutes)

|                             | Mean Age    | Indication       | Tissue Weight | Resection Time |
|-----------------------------|-------------|------------------|---------------|----------------|
| EK Mayer, S 1997-2007       | 66.8yrs     | LUTS (56%)       | 25.3g         | 31.5           |
| Borboroglu et al. 1991-1998 | 67yrs       | LUTS(81%)        | 18.8g         |                |
| Mebust et al. 1978-1987     | 69yrs       |                  | 22g           |                |
| MYC Wong 1994               | 69.2yrs     | AUR (54%)        | 24.2gm        |                |
| KB Lim 2004                 | 69.4 yrs    | LUTS (51%)       | 22.8          | 41.8           |
| Michael müntener,2006       | 69yrs       |                  |               |                |
| <b>Our study</b>            | <b>68.3</b> | <b>AUR (67%)</b> | <b>28.8</b>   | <b>24.5</b>    |

Failure to void after TURP is reported in 0.5-11% of patients [2]. In the Mebust's series, 2.4% of patients were discharged with an indwelling Foley catheter. The most common cause for this was thought to be hypotonic bladder [3].

In our series, 3.85% of the patients could not void satisfactorily, hence they had to be re-catheterized. Among them, 75% successfully voided in the next trial voiding after first week.

Most of the patients with unsuccessful first trial without catheter had relatively larger size (70% of them had prostate larger than 40gms) of prostate. All our patients ultimately voided satisfactorily.

The incidence of UTI was 1.6 % to 16% in various studies. But in our study group, this was 7.5%. But no patients had urosepsis [5]

|                            | UTI   | Uro - sepsis | Failure to void | Incontinence (Temporary) | Non-TURP-complications | Mortality |
|----------------------------|-------|--------------|-----------------|--------------------------|------------------------|-----------|
| Reich O,2008               |       |              |                 |                          |                        | 0.1%      |
| Rassweiler J               | 1.7%  |              | 3%              | <0.5%                    |                        |           |
| EK Mayer, S 97-2007        | 7.6%  |              | 5.8%            |                          |                        | 0%        |
| Michael Müntener,2006      | 1.4%  |              | 4.5%            |                          |                        | 0%        |
| KB Lim 2004                |       |              |                 |                          |                        | 0.7%      |
| Borboroglu et al.1991-1998 | 6.1%  |              | 7.1%            |                          |                        | 0%        |
| MYC Wong 1994              | 16%   | 2%           | 9%              |                          |                        | 0.6%      |
| Our Study                  | 7.45% | 0            | 8.9%            | 1.7%                     | 8.14%                  | 0.48%     |

Peri-operative bleeding requiring blood transfusion was 0.4% to 6.4% in various study groups, and it is 6.49% in our study.

The incidence of TUR syndrome is 0 to 1.8% among different studies. In our study, the rate of TUR Syndrome is 1.4%.

|                             | Complication rate | Bleeding - Transfusion | Clot retention | Re-intervention | TUR Syndrome |
|-----------------------------|-------------------|------------------------|----------------|-----------------|--------------|
| EK Mayer, S 1997-2007       |                   | 2.8%                   |                | 4.3%            |              |
| Borboroglu et al. 1991-1998 |                   | 0.4%                   |                | -               |              |
| Mebust et al. 1978-1987     |                   | 6.4%                   |                | -               |              |
| MYC Wong 1994               |                   | 11%                    | 1.8%           | 1.8%            | 1.8%         |
| KB Lim 2004                 |                   | 11%                    | 3.5%           | 3.5%            | 0.03         |
| Rassweiler,J,2006           |                   | 0.4%                   | 2%             | 1.3-5%          | 0            |
| Uchida T1993 M              | 13.6%             |                        |                | 3.5%            | 0.6%         |
| Reich O,2008                | 2.9%              |                        |                |                 | 1.4%         |
| Our Study                   | 17.5%             | 6.49%                  | 5.53%          | 0.7%            | 1.4%         |

Hypertension is the most common (75%) co-morbid condition in our patient group. This is followed by COPD in 55.53% of patients.

| Co-morbidity | Our Study (%) | Uchida T et al 1993 May (%) |
|--------------|---------------|-----------------------------|
| Hypertension | 75            | 6.49                        |
| CAD          | 17.07         | 2.3                         |
| COPD/ Asthma | 55.53         | 1.9                         |

|                   |       |     |
|-------------------|-------|-----|
| Diabetes Mellitus | 18.75 | 3.8 |
| Renal Failure     | 4.10  | 0   |
| CVA               | 0.48  | 0   |
| CLD               | 0.96  | 0   |

### Conclusion

Despite the introduction of many minimally invasive techniques, TURP still remains the gold standard in the surgical management of benign prostatic hyperplasia. We retrospectively studied 416 patients' data that underwent TURP in our Institution over two year period. The average age of our patients is 68.3years, which is comparable to other series. The indication for TURP in our series is mainly Acute urinary retention. Resection time is comparatively lesser in our series. The average weight of prostate resected is comparable. Our peri-operative complication rate is 17.5%, comparable to overseas series. The most common complication is UTI (7.45%). Bleeding, clot retention, return to OT, failure to void on catheter removal etc are also similar to overseas reports.

Proper selection of the patients is the key to successful voiding after TURP and every effort should be made to rule 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

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