

How to Cite:

Patel, H. A., Parmar, A. J., Joshi, A. H., Agrawal, A. A., & Ninama, S. M. (2022). A descriptive study of post-operative complications of transurethral resection of prostate. *International Journal of Health Sciences*, 6(S8), 317–326.
<https://doi.org/10.53730/ijhs.v6nS8.9717>

A descriptive study of post-operative complications of transurethral resection of prostate

Harsh A. Patel

Assistant Professor, Department of General Surgery, Dr N. D. Desai Faculty of Medical Science & Research Gujarat, India

Alpesh J. Parmar

Associate Professor, Department of General Surgery, Dr N. D. Desai Faculty of Medical Science & Research Gujarat, India

Amitkumar H. Joshi

Assistant Professor, Department of General Surgery, Dr N. D. Desai Faculty of Medical Science & Research Gujarat, India

Aakash A. Agrawal

Senior Resident, Department of General Surgery, Dr N. D. Desai Faculty of Medical Science & Research Gujarat, India

Shireesh M. Ninama*

Assistant Professor, Department of General Surgery, Dr N. D. Desai Faculty of Medical Science & Research Gujarat, India

*Corresponding author

Abstract---Introduction: Because of the introduction of improved technology like diathermy and visual scopes, Transurethral resection of prostate (TURP) has become a comparatively safer treatment in recent years. However, there is a danger of developing TURP syndrome and electrolyte imbalance, particularly in individuals with high-risk cardiac disease. Aim: This study was performed for the identification of course, duration, and occurrence of complications in post-operative patients with TURP. Materials and Methods: A descriptive study comprising 52 patients was conducted at C.U. Shah Medical College and Hospital, Surendranagar, Gujarat, India from 8th February 2019 to 1st November 2020, covering 20 months. Results: The study focused on the distribution of patients as per age and post-op complications, co-morbid conditions, DRE grading, etc. Also, the study correlates the volume of the prostate with post-operative complications, prostate volume with S-PSA, etc. Furthermore, the

study focused on early complications after TURP as well as late post-operative complications after TURP. Conclusion: This descriptive observational study highlighted several postoperative complications after TURP. It was observed that the incidence of complication rate is increasing with an increasing volume of the prostate. The incidence rate was around 50% patients with the prostate size >50cc, which was due to more operative time to resect the prostate which leads post-operative complications. The complications rate was the same in the age group of <60 years and between 60 to 65 years, and the rate was low in the age group of >65 years.

Keywords---prostate, benign prostatic hyperplasia, transurethral resection prostate, post-operative, complications, investigations.

Introduction

Benign prostatic hyperplasia (BPH) is a urological disorder that affects males in their middle to late twenties and thirties. Approximately 10% of males under the age of 40 are affected by it, while the prevalence increases to 80% in the age range of 80 years and above. Hyperplasia (not hypertrophy) is the pathological process that occurs in BPH, and it affects both the stromal and glandular components of the prostate gland. Many patients experience a considerable reduction in their quality of life (QOL) as a result of this illness. Despite the fact that the majority of people seek medical attention because of unpleasant symptoms, BOO was discovered in 60 percent of those who were symptomatic and 52 percent of those who were asymptomatic [1, 2]. Lower urinary tract problems have a negative impact on the patient's overall quality of life. An estimated 30 percent of males over the age of 65 who are experiencing troublesome symptoms may need medical intervention [3]. TURP is the second most frequent surgical procedure done on males over the age of 50, behind only cataract surgery in terms of frequency. In spite of the fact that numerous innovative methods of BPH management have been discovered, TURP remains the gold standard when it comes to the treatment of this condition [4]. When it comes to the treatment of BPH, LASERs are increasingly taking over from TURPs, thanks to advances in endourology. Despite the fact that the holmium laser (HoLEP) is widely considered to be the gold standard, several urologists are skeptical of its status as the gold standard. The cost of these lasers is prohibitively expensive, which is a significant drawback [5, 6].

Because of the introduction of improved technology like diathermy and visual scopes, TURP has become a comparatively safer treatment in recent years. However, there is a danger of developing TURP syndrome and electrolyte imbalance, particularly in individuals with high-risk cardiac disease. The danger is heightened by the use of glycine as an irrigation liquid. The invention of bipolar diathermy using normal saline as the irrigant fluid resulted in a reduction in the incidence of problems. Acute urinary retention is a serious symptom experienced by men who have acquired BPH. In the medical community, it is characterized as an unexpected and unpleasant inability to void one's own [7,8]. Despite the fact that AUR may be caused by a variety of factors, BPH is the most frequent.

According to some estimates, the frequency of AUR in males with BPH might reach as high as 53 percent [9]. AUR is a debilitating disorder. A higher risk of death and morbidity has been found in males who present with AUR, according to earlier research [10,11]. In Western nations, AUR was the most common complaint among males who had TURP, with 20-42 percent complaining of it [12]. It has been noted that men with BPH who develop AUR have an increase in surgical complications as well as prolonged hospital stays. Patients who presented with AUR had a significant death rate in the first three years after prostatectomy, according to studies [13, 14].

This study was performed for the identification of the course, duration, and occurrence of complications in post-operative patients of TURP. The study focused on the distribution of patients as per age and post-op complications, co-morbid conditions, DRE grading, etc. Also, the study correlates the volume of the prostate with post-operative complications, prostate volume with S-PSA, etc. Furthermore, the study focused on early complications after TURP as well as late post-operative complications after TURP.

Materials and Methods

Study design

A descriptive study was conducted at C.U. Shah Medical College and Hospital, Surendranagar, Gujarat, India.

Study duration

The study was performed from 8th February 2019 to 1st November 2020, covering 20 months.

Sample size

A total of 52 patients were enrolled in this study.

Inclusion criteria

The following criteria were specifically included in this study: (A) Prostate size >30 g; (B) Men more than 45 years and less than 70 years; (C) Post void residual urine (PVR) exceeding 100 mL; and (D) Patients who gave informed consent for the study were included.

Exclusion criteria

The following criteria were specifically excluded from this study: (A) Urethral stricture; (B) Neurogenic bladder; (C) Previous prostate or urethral surgery; (D) Unwilling patients; (E) Prostate cancer.

Study information

Patients who were admitted to C.U. Shah Medical College and Hospital with lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH) are included in the study. The diagnosis of BPH was confirmed both by clinical evaluation and by the radiological method. Patient age and associated co-morbid conditions were recorded. IPSS grading system was used to assess the patients' symptoms. It consists of 7 symptoms with a score of 0 to 5 for each symptom and the total maximum score is 35. The low grade is 0 to 7, moderate grade is 8 to 19, and high grade is 20 to 35. Based on this patients with moderate to high grades may need interventions. DRE; digital rectal examination was done to assess the grade as well as the consistency, symmetry of the gland, any obliteration of median furrow and lateral sulci, and also the presence of any nodules was assessed. It was done under local anesthesia with the patient in the left lateral position. BPH was graded, depending on the encroachment of the prostate into the rectal lumen.

Investigations

Basic blood investigations like complete blood count, renal function test, random blood sugar, and serum electrolytes were done before the procedure. Serum electrolytes were done in all the patients after the procedure and during surgery if the clinical picture is suggestive of TUR syndrome. Routine urine analysis and urine culture were done in all the patients. Urine culture was done by collecting the midstream voided urine in patients. If the culture was found to be positive appropriate antibiotic was given and UTI was treated before the procedure. Urine culture was also done in all the patients after the procedure. Serum PSA was measured in all the patients who have enrolled in this study. If the patients presented with a catheter, serum PSA was done one week later. If the PSA was in the gray zone, or if the percentage of free PSA was low, TRUS followed by biopsy was done to rule out malignancy. If the patient was found to be positive for malignancy he was excluded from the study. USG for all the patients mostly transabdominal to measure the prostate size was done to assess the PVR. USG was done in all the patients postoperatively also to measure the PVR.

Methods of estimating prostate size

The size can be estimated either by transabdominal, transrectal, or transperineal USG. As the specific gravity of the gland and that of water are the same, volume is roughly equivalent to the weight of the prostate; *i.e.* 1 cm³ equals approximately 1 g of prostate tissue. The following dimensions are required to calculate the prostate volume:

Axial plane: Anteroposterior dimension and the transverse dimensions.
Sagittal plane: Longitudinal dimension (measured just off the midline).

Surgical therapy

The surgical therapy was mainly TURP. The procedure was done using monopolar current under spinal anesthesia. With the patient in lithotomy position,

cystoscopy was done and assesses the prostate grade and inspects the bladder for growth, stone and any signs of obstructions are seen. Resection was done using 24 frBaumrucker resectoscope. Glycine was employed as irrigant fluid intraoperatively. At the end of the procedure hemostasis was achieved and 22 fr3 way Foleys catheterization was done in all cases and irrigation started. Traction was applied for all cases. The catheter was removed for all the cases on 3rd or 4th post-operative day. If the patient develops retention after catheter removal, recatheterization of the patient was done, and advised to take alpha-blocker and come for review after 1 week and give trial void. Post-operative complications like urinary tract infection, sepsis, hematuria, blood transfusion, post operative LUTS, recatheterization, length of hospital stay, stricture, and re-surgery were recorded.

Results

Distribution of patients as per Age and Post-op complications

In the study, out of 52 patients, 19 patients (36.5%) were in the group of <60 years, 19 patients (36.5%) lie in between 60 years to 65 years age group, and 14 patients (26.9%) were in the age group of >65 years. The complications rate was highest (9) in the age group of 60-65 years, in contrast to it, the age group of <60 years had only 3 complications, and strikingly no complications were noticed in the age group of >65 years (Table 1).

Table 1. Distribution of age group and post-op complication among patients

Age groups	Number of patient	Percentage (%)	Post op complications
<60 years	19	36.5	3
60-65 years	19	36.5	9
>60 years	14	26.9	0

Distribution of patients according to co-morbid conditions

In the study, 10 patients had hypertension, 12 patients had diabetes mellitus, and 5 patients had ischemic heart disease. The post-op complications were highest (4) in patients suffering from hypertension, which were followed by similar frequencies (3) in patients suffering from diabetes mellitus as well as ischemic heart disease (Table 2).

Table 2. Distribution of patients as per co-morbid conditions

Comorbid conditions	Number of patients with Co-morbid conditions	Number of patients with Post-op complications
Hypertension	10	4
Diabetes Mellitus	12	3
Ischemic Heart Disease	5	3

Distribution of patients according to DRE grading

In the study, 21 patients had DRE grade-1 enlargement of prostate, 31 had grade-2 enlargement of prostate, and no patient had grade 3 enlargement of prostate (Table 3).

Table 3. Distribution of patients as per DRE grading

DRE grading	Number of patients
Grade 1	21
Grade 2	31
Grade 3	0

Correlations between volume of prostate and post-operative complications

In the study, 11 patients had prostate size of <40 cc, 35 patients had prostate size of 40 to 50 cc, and only 6 patients have prostate size of >50 cc. Among the patients having prostate size of <40 cc, only 2 patients (18.18%) had complications whereas 7 patients (20.5%) belonging to 40 cc to 50 cc prostate volume group had complications. In contrast to both groups, nearly half of patients (3; 50%) fall under the prostate volume group of >50 cc (Table 4).

Table 4. Distribution of patients as per volume of prostate and post-operative complications

Prostate volume	Number of patients	Number of patients develop complications	Percentage (%)
<40 cc	11	2	18.18
40 to 50 cc	35	7	20.50
>50 cc	6	3	50

Correlation of prostate volume with S-PSA

In the study, the mean prostate volume was found to be 44.21 cc and the mean S-PSA value was 3.094.

Early-complications after TURP

In the study, the major incidence(s) of developed early post-operative complications after TURP were hematuria (3 patients), the highest incidence which was followed by UTI post-operative and Re-catheterization with similar frequencies (2 patients). A single incidence was reported for BT infusion, however, no incidences were observed in TUR syndrome and sepsis (Table 5).

Table 5. Early post-operative complications after TURP

Early complication	Number of patients	Percentage (%)
TUR syndrome	0	0
Hematuria	3	5.8

BT infusion	1	1.9
Sepsis	0	0
UTI post-operative	2	3.8
Re-catheterization	2	3.8

Late post-operative complications after TURP

In the study, the major incidence(s) of developed late post-operative complications after TURP were LUTS (8 patients), stricture (1 patient), and re-surgery (no patients) (Table 6).

Table 6. Late postoperative complications after TURP

Late complications	Number of patients	Percentage (%)
LUTS	8	15.4
Stricture	1	1.9
Re surgery	0	0

Discussion

Benign prostatic hyperplasia is a common urological problem affecting men in the older age group. Acute urinary retention may be the presenting symptom. The prevalence rate of AUR in men with BPH varies. In western countries, the incidence rate was lower, ranging from 20% to 40%, whereas in developing countries, the rate was quite higher, can reach even more than 50%. The reason for the increased incidence of AUR in men with BPH in developing countries is unawareness of the symptom of BPH, fear of surgery, and cost factors. In our study, 52 patients were enrolled and diagnosed with BPH with their symptoms, clinical examinations, and USG. We compared the following factors of preoperative variables like age, presence of any co-morbid illness, gland size, grade of the gland by DRE, serum PSA and post-operative variables like hematuria, need for blood transfusion, UTI, sepsis, re-catheterization rate, PVR, length of hospital stay, lower urinary tract stricture, re surgery rate, and TUR syndrome.

Chen *et al.* conducted a retrospective study and found that post TURP complications were more in patients who presented with acute urinary retention when compared to those who presented without retention [15]. Similarly, Sajjad *et al.* conducted a study and found that the chance of post-TURP complications is more in those patients who present with acute urinary retention [16]. There are a few more studies that found that the complication rates are more for the patients with acute urinary retention. The purpose of this study is to find that whether there is any difference in the post-TURP complications and outcome of surgery for BPH for patients in the population so that it can be prevented and make patients get ready to tackle these complications and create awareness among people. However, no compliance was presented for these studies with our study.

In our study, men aged between 40 to 70 years were included, of these the mean age was 61.06. The prevalence rate remained the same for age groups of <60 years and 60-65 years. Various studies like the Olmsted county study [17], Meigs

et al. [18], and Sønksen *et al.* [19] showed that complications occur more commonly in the older age group. Regarding the co-morbid factors, hypertension occurs in 19.2% of patients, diabetes mellitus occurred in 23.1% of patients, and 9.6% of patients had ischemic heart disease.

No patient developed TUR syndrome at end of the procedure. In some cohort studies, the incidence of developing TUR syndrome is around 0.5 to 10. In our study, 5.8% of patients had persistent hematuria after TURP. Chen *et al.* [15] study showed hematuria in 7.4% of patients, which closely matched with data. However, Mebust *et al.* [20] study showed hematuria and blood transfusion of 6.4%, Rassweiler *et al.* [21] showed 2%, whereas it was significantly higher (22%) in a study done by Doll *et al.* [22]. The blood transfusion rate was 1.9% for patients which matched with the study performed by Chen *et al.* [15] which showed blood transfusion rate of 1.5% for patients.

Urine culture and sensitivity were performed for all our patients post-operatively. In our study, 3.9% of patients had UTIs as documented by the urine culture report. These patients were given a course of culture-specific antibiotics. Chen *et al.* [15] study reported a UTI rate of 15.6% in a group whereas Mebust *et al.* [20] showed 3.9%, and Borboroglu *et al.* [23] showed 4%, whereas, it was quite higher in Doll *et al.* [22] study which showed 25% UTI rate. In our study, no one developed sepsis after TURP. Chen *et al.* [15] study reported sepsis in 1.4% only in patients whereas low incidences were perceived in studies by Mebust *et al.* [20] and Haupt *et al.* [24] where urosepsis occurred in 0.2% of patients after TURP. In contrast to it, Doll *et al.* [21] showed extensively high urosepsis (3%).

In our study, 3.8% of patients developed urinary retention after catheter removal in TURP. If the patient develops urinary retention, re-catheterization of the patient was done, alpha-blocker was administered, and given a trial void after 1 week. All of our patients responded well in trial voiding. Contrasting our data with the reported studies revealed that Chen *et al.* [15] showed the re-catheterization rate of 0% for patients. Mebust *et al.* [20] presented 6.5% of patients, Doll *et al.* [22] demonstrated 3% of patients, and Borboroguli *et al.* [23] illustrated a 7.1% re-catheterization rate after TURP.

8 (15.4%) patients developed irritative lower urinary tract symptoms like incontinence, increased frequency, and urgency. In our study, 1 patient developed lower urinary tract stricture. This was diagnosed 2 to 3 months after TURP, when the patient showed a thin stream and strain to void. AUG was done for these patients and diagnosed the stricture. An optical internal urethrotomy was advised for these patients. These patients were not willing for urethrotomy; hence dilatation was done. The reasons for the stricture formation may be due to instrumental injury, diathermy injury during TURP or prolonged catheterization. The study by Chen *et al.* [15] showed 3.2% of patients have developed post-operative stricture. No patient in our study developed clot retention. But, in some other studies incidence of re-surgery for clot retention was between 1% to 1.4 %.

Conclusion

This descriptive observational study highlighted several postoperative complications after TURP. It was observed that the incidence of complication rate is increasing with increasing volume of prostate. The incidence rate was around 50% in patient with prostate size is >50cc, which was due to more operative time to resect prostate that leads postoperative complications. To avoid these complications, two-phase TURP is recommended. The complications rate was same in age group of <60 years and between 60 to 65 years, and the rate was low in age group of >65 years. Hematuria, BT infusions, postoperative sepsis and re-catheterizations were the common early complications after TURP, of which most common complication was hematuria that develop early. LUTS, Stricture were identified as the late complications that develop after TURP, of which LUTS was the most common late complications that develop after TURP.

Conflict of interest

No conflict of interest is declared.

Funding information

No agency provided any funding for this study.

Acknowledgement

No acknowledgement is declared.

References

1. Dabhoiwala N, Osawa D, Lim AT, Abrams P. The ICS-'BPH'Study: uroflowmetry, lower urinary tract symptoms and bladder outlet obstruction. *Br J Urol*. 1998;82:619-23.
2. Bøtker-Rasmussen I, Bagi P, Jørgensen JB. Is bladder outlet obstruction normal in elderly men without lower urinary tract symptoms?. *Neurourol Urodyn*. 1999;18(6):545-51.
3. Hutchison A, Farmer R, Chapple C, Berges R, Pientka L, Teillac P, Borkowski A, Dobronski P. Characteristics of patients presenting with LUTS/BPH in six European countries. *Eur Urol*. 2006;50(3):555-62.
4. McConnell JD, Barry MJ, Bruskewitz RC. Benign prostatic hyperplasia: diagnosis and treatment. Agency for Health Care Policy and Research. Clinical practice guideline. Quick reference guide for clinicians. 1994;8:1-7.
5. Tan AH, Gilling PJ, Kennett KM, Frampton C, Westenberg AM, Fraundorfer MR. A randomized trial comparing holmium laser enucleation of the prostate with transurethral resection of the prostate for the treatment of bladder outlet obstruction secondary to benign prostatic hyperplasia in large glands (40 to 200 grams). *J Urol*. 2003;170(4):1270-4.
6. Westenberg A, Gilling P, Kennett K, Frampton C, Fraundorfer M. Holmium laser resection of the prostate versus transurethral resection of the prostate: results of a randomized trial with 4-year minimum long-term followup. *J Urol*. 2004;172(2):616-9.
7. Emberton M, Anson K. Acute urinary retention in men: an age old problem. *BMJ*. 1999;318(7188):921-5.
8. Choong S, Emberton M. Acute urinary retention. *BJU Int*. 2000;85(2):186-

- 201.
9. Murray K, Massey A, Feneley RC. Acute urinary retention--a urodynamic assessment. *Brit J Urol.* 1984;56(5):468-73.
10. Armitage JN, Sibanda N, Cathcart PJ, Emberton M, van der Meulen JH. Mortality in men admitted to hospital with acute urinary retention: database analysis. *BMJ.* 2007;335(7631):1199-202.
11. Mebust WK, Holtgrewe HL, Cockett AT, Peters PC, Writing Committee. Transurethral prostatectomy: immediate and postoperative complications. A cooperative study of 13 participating institutions evaluating 3,885 patients. *J Urol.* 2002;167(2):999-1003.
12. Pickard R, Emberton M, Neal DE. The management of men with acute urinary retention. National Prostatectomy Audit Steering Group. *Brit J Urol.* 1998;81(5):712-20.
13. Loh SY, Chin CM. A demographic profile of patients undergoing transurethral resection of the prostate for benign prostate hyperplasia and presenting in acute urinary retention. *BJU Int.* 2002;89(6):531-3.
14. Malone PR, Cook A, Edmonson R, Gill MW, Shearer RJ. Prostatectomy: patients' perception and long-term follow-up. *Brit J Urol.* 1988;61(3):234-8.
15. Chen JS, Chang CH, Yang WH, Kao YH. Acute urinary retention increases the risk of complications after transurethral resection of the prostate: a population-based study. *BJU Int.* 2012;110(11c):E896-901.
16. Khan S, Rehman S, Zaidi K, Qamar SS, Sajjad K, Ullah I, Nazir M. A Comparative Study on Outcome of Holmium Laser Enucleation of Prostate and Transurethral Resection of Prostate in Prostatic Hyperplasia. *Ann King Edw Med Univ.* 2020;26(3):1-5.
17. Jacobsen SJ, Jacobson DJ, Girman CJ, Roberts RO, Rhodes T, Guess HA, Lieber MM. Treatment for benign prostatic hyperplasia among community dwelling men: the Olmsted County study of urinary symptoms and health status. *J Urol.* 1999;162(4):1301-6.
18. Meigs JB, Mohr B, Barry MJ, Collins MM, McKinlay JB. Risk factors for clinical benign prostatic hyperplasia in a community-based population of healthy aging men. *J Clin Epidemiol.* 2001;54(9):935-44.
19. Sønksen J, Barber NJ, Speakman MJ, Berges R, Wetterauer U, Greene D, Sievert KD, Chapple CR, Montorsi F, Patterson JM, Fahrenkrug L. Prospective, randomized, multinational study of prostatic urethral lift versus transurethral resection of the prostate: 12-month results from the BPH6 study. *Eur Urol.* 2015;68(4):643-52.
20. Mebust WK, Valk WL. Transurethral prostatectomy. *Benign Prostatic Hypertrophy.* 1983:829-46.
21. Rassweiler J, Teber D, Kuntz R, Hofmann R. Complications of transurethral resection of the prostate (TURP)—incidence, management, and prevention. *Eur Urol.* 2006;50(5):969-80.
22. Doll H, Black NA, McPherson K, Flood AB, Williams GB, Smith JC. Mortality, morbidity and complications following transurethral resection of the prostate for benign prostatic hypertrophy. *J Urol.* 1992;147(6):1566-73.
23. Borboroglu PG, Kane CJ, Ward JF, Roberts JL, Sands JP. Immediate and postoperative complications of transurethral prostatectomy in the 1990s. *J Urol.* 1999;162(4):1307-10.
24. Haupt G, Pannek J, Benkert S, Heinrich C, Schulze H, Senge T. Transurethral resection of the prostate with microprocessor controlled

- electrosurgical unit. *J Urol*. 1997;158(2):497-501.
25. Nyandra, M., Suryasa, W. (2018). Holistic approach to help sexual dysfunction. *Eurasian Journal of Analytical Chemistry*, 13(3), pp. 207–212.
 26. Rakhmonov, O. M., Shadmanov, A. K., & Juraev, F. M. (2021). Results of endoscopic treatment of benign prostatic hyperplasia in patients with metabolic syndrome. *International Journal of Health & Medical Sciences*, 5(1), 21-25. <https://doi.org/10.21744/ijhms.v5n1.1811>