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Original Article

Impact of Managed Early Postoperative Complications on Clinical Outcomes in Patients Undergoing Transurethral Resection of the Prostate

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ABSTRACT

Background: *Transurethral resection of the prostate (TURP) is the gold standard operation for symptomatic benign prostatic hyperplasia (BPH), but early postoperative complications can affect outcomes. The objective was to examine the prevalence and association of comorbidities with early postoperative complications and outcomes following TURP.* ***Methods & Materials:*** *The prospective observational study was conducted in BIRDEM General Hospital, Dhaka, between November 2016 and May 2017, on 50 BPH patients who were subjected to TURP. Demographics, comorbidities, perioperative parameters, complications, management strategies, and outcomes were gathered. Statistical analysis was performed using SPSS version 20.* ***Results:*** *Mean patient age was 68.7±8.1 years, with 52% of patients aged 61-70 years. Comorbidities were present in 84% of patients, most frequently diabetes mellitus (66%), urinary tract infections (54%), and chronic kidney disease (34%). Prostate size was a mean of 54.3±30.7g with 18.6±9.3g of tissue resected. Early postoperative complications occurred in 22% of patients, most frequently hematuria (16%). Treatment modalities comprised irrigation of bladder (8%), tranexamic acid (2%), or combination therapy (6%) for hematuria, while clot retention (8%) was managed equally by Tommy syringe evacuation or cystoscopy. Despite the complications, complete resolution without sequelae was observed in 90.91% of the affected patients.* ***Conclusion:*** *Despite the large comorbidity in patients undergoing TURP, appropriate management of early postoperative complications results in a favorable outcome in most patients. Careful preoperative assessment, optimization of comorbidity, and management of complications early are required to enhance the safety and efficacy of TURP in an increasingly complex patient population.*

Keywords: *TURP, BPH, Prostate*

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is among the most common urological conditions in older men worldwide, with a prevalence that increases exponentially with age [1]. The non-cancerous enlargement of the prostate gland leads to progressive lower urinary tract symptoms (LUTS) that can significantly impact quality of life in elderly men [2]. The pathophysiology comprises both static components of prostate enlargement and dynamic components of increased smooth muscle tone, both of which culminate to result in bladder outlet obstruction (BOO) [3]. Transurethral resection of the prostate (TURP) remains the gold standard operation for symptomatic BPH despite the introduction of many minimally invasive options [4]. It has demonstrated long-term effectiveness in alleviating BOO symptoms with established improvement in urinary flow rates, reduction in post-void residual urine volume, and enhancement of quality-of-life parameters [5]. It involves endoscopic removal of the obstructing prostatic tissue by electrocautery using a resectoscope with sparing of the prostatic capsule [6]. However, TURP is not without risks, and postoperative complications still are an issue. Early complications typically happen within the initial postoperative period and include hematuria, clot retention, urinary tract infections, transurethral resection syndrome, and urinary retention [7]. Complications generally can compromise surgical outcomes, prolong hospitalization, increase health care costs, and decrease patient satisfaction [8]. The rate of early complications following TURP has been described as ranging from 11.1% to 38% in contemporary series [9]. Specifically interesting is the contribution of comorbidities to the formation and intensity of post-TURP complications. Age-

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related physiological changes combined with diabetes mellitus, hypertension, cardiovascular disease, and chronic kidney disease can predispose to adverse perioperative outcomes [10]. The complex interplay between such comorbidities and surgical outcomes warrants detailed investigation to optimize patient selection, preoperative optimization, and postoperative care [11]. Prompt recognition and optimal management of early complications are important components of perioperative management that can potentially decrease adverse outcomes [12]. A variety of methods, including continuous bladder irrigation, clot evacuation procedures, hemostatic agents, and antimicrobial prophylaxis, have been used to treat such complications [13]. However, there is a lack of information on the efficacy of these interventions and their impact on final clinical outcomes [14]. This study aimed to analyze the occurrence and association of comorbidities with early postoperative complications and outcomes in patients who had TURP in our institutional practice. By identifying risk factors, characterizing complication profiles, describing management strategies, and determining their effects on surgical outcomes, this study aims to provide data that could inform evidence-based perioperative practice. Clarification of these relationships is paramount to optimizing surgical results, patient satisfaction, and the risk-benefit ratio of TURP in contemporary management of BPH.

METHODS & MATERIALS

This online prospective observational study was conducted at the Department of Urology, BIRDEM General Hospital, Dhaka, from November 2016 to May 2017. The study population comprised patients with benign enlargement of the prostate (BEP) who came to the department. The sample size of the study was 96, but due to time constraint, only 50 cases were used. Purposive sampling was adopted for the sampling of patients. Inclusion criteria were transurethral resection of the prostate (TURP) for bladder outlet obstruction due to BEP in patients who consented. Exclusion criteria were bladder injury treated otherwise, simultaneous bladder stone or urethral procedure, repeat TURP, and bladder outlet obstruction due to other than BEP reasons. Data were collected through informed written consent, a structured questionnaire, and thorough documentation of demographic, clinical, and investigational parameters such as comorbidities, hemoglobin, serum creatinine, PSA, urine analysis, ultrasound, and uroflowmetry. Pretesting data sheets and correcting discrepancies through review and expert opinion ensured quality data. Statistical tests were carried out with SPSS version 20 by employing chi-square and Student's t-tests with $p < 0.05$ significance level. Ethical permission was granted by Institutional Review Board of BIRDEM. Confidentiality, voluntary consent, and right to withdraw of the participants were guaranteed strictly according to the Helsinki Declaration. No experimental interventions had been implemented.

RESULTS

Table – I: Distribution of the Study Population According to Age Groups, Co-morbidities, and Combination of Co-morbidities (*n*=50)

Category	Sub-category	Number of Patients (n)	Percentage (%)
Age Group (in years)	≤50	2	4%
	51 – 60	13	26%
	61 – 70	26	52%
	71 – 80	3	6%
	>80	6	12%
Mean Age ± SD (years)		68.7 ± 8.1	
Co-morbidity Distribution	Diabetes Mellitus (DM)	33	66%
	Hypertension (HTN)	13	26%
	Cardiovascular Disease (CVD)	3	6%
	Cerebrovascular Disease (CVD)	2	4%
	Chronic Kidney Disease (CKD)	17	34%
	Associated Urinary Tract Infection (UTI)	27	54%
Combination of Co-morbidities	DM + HTN + IHD + CKD + UTI	1	2%
	DM + HTN + CKD	12	24%
	DM + IHD	2	4%
	DM + CKD + UTI	4	8%
	DM + CVD + UTI	2	4%
	DM + UTI	12	24%
	UTI	9	18%
	Normal (no co-morbidity)	8	16%

Table I illustrates the demographic and clinical characteristics of the study population of 50 patients who underwent TURP. The age distribution indicates that the majority of the patients (52%) were in the 61-70 years age group with a mean age of 68.7 ± 8.1 years. The youngest age group (≤50 years) consisted of only 4%, and 12% were ≥80 years old. Regarding comorbidities, the most frequent illness was diabetes mellitus in 66% of the patients, followed by urinary tract infection

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(54%) and chronic renal disease (34%). Hypertension was detected in 26% of the patients, while cardiovascular and cerebrovascular diseases were less common (6% and 4% respectively). Comorbidity pairs analysis shows that 24% of patients had diabetes mellitus and hypertension coexisting with chronic kidney disease, and another 24% of patients had diabetes coexisting with urinary tract infection. Ironically, only 16% of the study population were free of comorbidities, reflecting high medical complexity among patients who underwent TURP in this population.

Table – II: Distribution of the Study Population According to Clinical and Surgical Profile (*n*=50)

Clinical & Surgical Variables	Values
Prostate weight (mean±SD) (gm)	
Diagnosed	54.3±30.7
Resected	18.6±9.3
Type of anesthesia	
GA	3 (6%)
SA	47 (94%)
Operation time (mean±SD) (min)	48.3±29.7
Range: (min)	45 – 96
PVRU (mean±SD) (mL)	103.31±65.1 (100-210)

Table II summarizes the clinical and surgical parameters of the TURP procedures. The weight of the prostate was diagnosed on average as 54.3 ± 30.7 grams, while the resected tissue weight averaged at 18.6 ± 9.3 grams, indicating that close to one-third of prostatic tissue had been removed from the patient. With respect to anesthesia, spinal anesthesia (SA) was the preferred choice by far, being employed in 94% of all procedures, whereas general anesthesia (GA) was applied in just 6% of operations. The mean operation time was 48.3 ± 29.7 minutes with a range of 45 to 96 minutes, demonstrating significant variability in the duration of procedure. The mean post-void residual urine volume (PVRU) was 103.31 ± 65.1 mL, ranging from 100 to 210 mL, which reflects severe urinary retention in the preoperative phase for a majority of patients in this group.

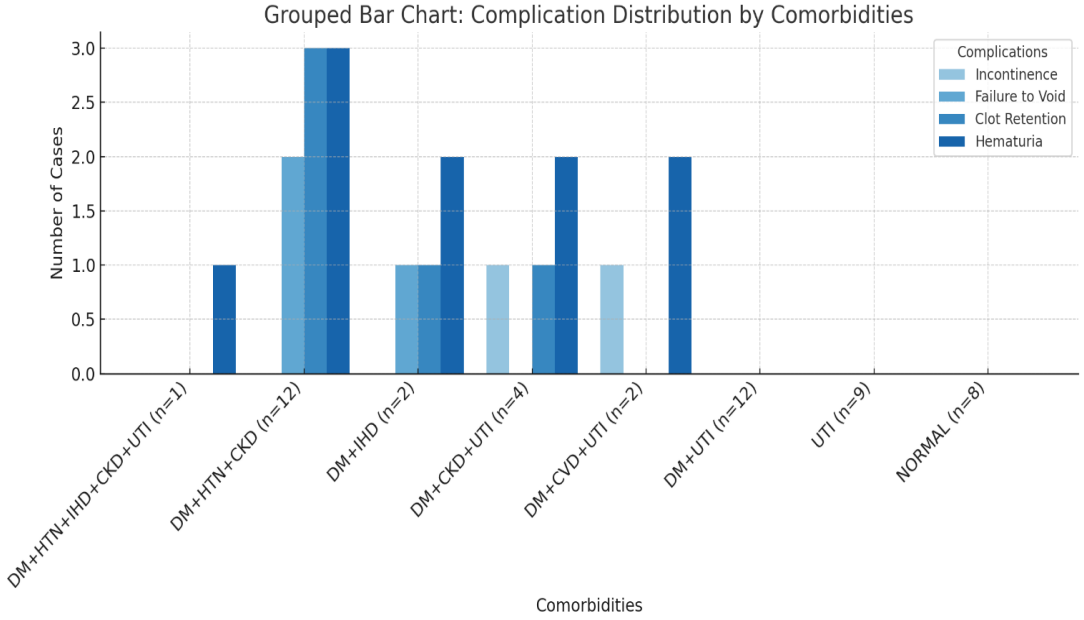

Figure – 1: Distribution of the Study Population According to a Combination of Complications and Co-morbidities (*n*=50)

Figure 1 represents the patient comorbidities versus postoperative complication frequency following TURP. Only one patient with multiple co-morbidities presented with hematuria. Two out of 12 patients with diabetes mellitus (DM), hypertension (HTN), and chronic kidney disease (CKD) presented with clot retention and inability to void, one of whom also presented with hematuria. Two patients with DM, cardiovascular disease (CVD), and urinary tract infection (UTI) also presented with hematuria as well as incontinence. Patients with zero pre-operative co-morbidities presented with zero complications. This would imply that the presence of more than one co-morbidity is associated with higher complication rates post-surgery.

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Table – III: Distribution of the Study Population According to Complications and Haematuria Management (*n*=50)

Category	Complication/Management Method	Number of Patients (n)	Percentage (%)
Complication Combinations	Hematuria and Clot Retention	1	2%
	Hematuria and Voiding Difficulties due to Clot Retention	3	6%
	Other Combinations / No Data	7	14%
	Total with Complication Combinations	11	22%
Other Complications	Hematuria	4	8%
	Hematuria + Clot Retention + Failure to Void	3	6%
	Hematuria + Clot Retention	1	2%
	Urinary Incontinence	3	6%
Haematuria Management	Bladder Irrigation Only	4	8%
	Bladder Irrigation + Tranexamic Acid	3	6%
	Tranexamic Acid Only	1	2%

Table III provides a breakdown of TURP postoperative complications and their management. From the table, 22% of patients presented with combinations of complications, among which hematuria and voiding difficulty due to clot retention were noted in 6% of patients, and hematuria and clot retention in 2%. Among other complications, hematuria alone was observed in 8% of patients, and 6% presented with a complex picture of hematuria, clot retention, and inability to void. Urinary incontinence occurred in 6% of the cases. As far as management strategies for hematuria are concerned, bladder irrigation alone was used in 8% of patients, whereas 6% were treated with a combination of bladder irrigation and tranexamic acid. Tranexamic acid alone was used to manage only 2% of patients. These findings highlight the heterogeneity of complication profiles following TURP and illustrate the personalized management strategies that were employed to address these adverse events in the initial postoperative period.

Table – IV: Management Methods and Outcomes of Clot Retention Complications

Complication Management Aspect	Category	Number of Patients (n)	Percentage (%)
Clot Retention Management (n=4)	Evacuated by Tommy Syringe	2	50%
	Evacuated by Cystoscopy	2	50%
Outcome of Complication Management (n=11)	Uneventful Outcome	10	90.91%
	Persistent Urinary Incontinence	1	9.09%

Table IV is specifically interested in the treatment techniques of clot retention complications and overall results of complication treatment. In patients with clot retention (n=4), interventions were evenly split between evacuation by Tommy syringe and evacuation by cystoscopy, with 50% of cases included in each of these. Even application suggests equal efficacy and appropriateness of both techniques among the study population. Outcome analysis shows impressive success in the control of complications, with 90.91% of complicated patients (n=11) experiencing uneventful recovery following effective intervention. Refractory urinary incontinence occurred in one patient (9.09%) despite treatment. The findings underscore the efficacy of appropriate and timely management methods in addressing early complications following TURP, resulting in successful clinical outcomes in the majority of cases despite the presence of early adverse events.

DISCUSSION

The present study elucidates the interaction between patient comorbidities, postoperative early complications, and outcomes after TURP. Findings of the present study show that patients who underwent TURP were discovered to have various comorbidities, viz., diabetes mellitus (66%) and urinary tract infection (54%). The load of such comorbidity is in agreement with reports from Rassweiler et al., in which they noted that patients with BPH aging population tend to have concomitant medical conditions influencing perioperative results [15]. Overall complication rate in our group was 22%, which is within the range of reported in current literature. Reich et al., in a multicenter analysis of 10,654 TURPs, had early complications in 11.1% of cases [16]. Our higher rate may be due to heavy comorbidity burden, particularly diabetes mellitus and baseline urinary tract infections. Diabetes has also been found to have a consistent association with more postoperative complications of urological procedures due to impaired wound healing, increased susceptibility to infection, and microvascular impairment [17]. Hematuria was the most common initial complication, being present in 16% of patients either alone or in combination with other complications. This also agrees with reports by Mebust et al., where bleeding complications were encountered in 6.4-22.2% of patients undergoing TURP [18]. Our results confirm Soleimani et al.'s report that patients with multiple comorbidities, particularly diabetes and cardiovascular disease, can be presumed to have higher vulnerability to bleeding complications due to alterations in vascular integrity and coagulation factors [19]. Management of hematuria included bladder irrigation and tranexamic acid infusion, with 90.91% of complicated cases experiencing

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uneventful recovery. This percentage attests to the importance of early identification and appropriate management. Taylor et al. also showed that early control of bleeding complications significantly reduced morbidity and prevented progression to more severe complications requiring surgical re-intervention [20]. Retention of the clot occurred in 8% of our population, treated similarly by Tommy syringe drainage and cystoscopy. Successful management in all cases is supported by reports from Descazeaud et al., who mentioned that most clot retention following TURP may be conservatively or minimally treated, without influencing functional outcomes [21]. One notable observation is the correlation between comorbidity pairs and complication patterns. Patients with diabetes mellitus and comorbid hypertension and chronic kidney disease exhibited greater vulnerability to complications. This result supports Dimeglio et al.'s "comorbidity synergy" idea of "multiple conditions producing an effect approaching an exponential multiplicative effect on perioperative risk" [22]. Our operative time (48.3±29.7 minutes), and tissue removed (18.6±9.3 grams) were comparable to contemporary series. Operative times of a meta-analysis by Wu et al. were within 39-56 minutes and a resection weight of 15.9-37 grams [23]. Greater resection time and more tissue resected are associated with increased risk of bleeding with experience [24]. Despite a complication in nearly a fourth of the patients, the results were overwhelmingly good with 90.91% of them experiencing complete resolution without sequelae. This attests to the fact that despite complications following TURP not being uncommon, their impact on results can be optimized if dealt with effectively. As Thomas et al. have also suggested, prevention protocols, early detection, and treatment of postoperative complications in a uniform manner constitute an integral step towards maximizing the risk-benefit ratio of TURP in the modern practice of BPH management [25].

Limitations of the Study

The study was constrained by the modest sample size (n=50) that could potentially restrict generalizability. The brief follow-up duration also examined early complications and did not examine long-term functional results. The single-center trial may reflect institution-specific practice patterns and may not accurately represent more general trends in TURP management.

CONCLUSION

This study demonstrates that although the rate of comorbidities (84%) is high in patients undergoing TURP, with appropriate management of the early postoperative complications, there are good outcomes in most cases (90.91%). Diabetes mellitus, urinary tract infections, and chronic kidney disease were the most common comorbidities, and hematuria was the most common complication. The findings of this study underscore the importance of strict preoperative assessment, comorbidity optimization, and prompt management of complications to enhance the safety and efficacy of TURP in an increasingly more complex population.

RECOMMENDATIONS

Future multicenter studies with larger sample sizes and longer follow-up periods are indicated to further characterize the relation of specific comorbidity patterns with profiles of complications. Perioperative management algorithms for individualized care in TURP patients with multiple comorbidities might be developed and tested using risk stratification instruments.

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