

Immediate outcome of transurethral resection of prostate at Muhimbili National Hospital

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**IMMEDIATE OUTCOME OF TRANSURETHRAL RESECTION OF
PROSTATE AT MUHIMBILI NATIONAL HOSPITAL**

By

Titus Ndimbo

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree
of Master Medicine (Urology) of**

**Muhimbili University of Health and Allied Sciences
October, 2019**

CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied science a dissertation entitled: “**Immediate outcome of transurethral resection of prostate at Muhimbili National Hospital**”, in (partial) fulfillment of the requirement for the degree of Master of Medicine (Urology) of Muhimbili University of Health and Allied Science.

Prof. Muhsin. M. Aboud

(Supervisor)

Date

DECLARATION AND COPYRIGHT

I, **Titus Ndimbo**, declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

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DEDICATION

I dedicate my dissertation to:

My Parents, Dr Samwel R Ndimbo and Inviolata P Ndimbo for their tirelessly guidance and support in my entire life.

My lovely Wife, Marygrace Msalila for her support, encouragement, prayers and taking good care of our lovely daughter and son in my physical absence.

My lovely daughter and son, Inviolata and Aviel. Daddy loves you so much.

ABSTRACT

Background: Benign prostate hyperplasia (BPH) is a common cause of lower urinary tract symptoms in aging men. Histopathologically, it is characterized by an increased number of epithelial and stromal cells in the periurethral area of the prostate. Transurethral resection of the prostate (TURP) is considered to be the gold standard for surgical treatment of BPH. It is one of the most commonly performed surgeries by urologists. Complications of TURP that have been reported include: TUR syndrome, erectile dysfunction, irritative voiding symptoms, bladder neck contracture, bleeding that leads to the need for blood transfusion, UTI, hematuria, clot retention, failure to void. Despite TURP being one of the commonly performed surgical procedures in the department of urology at MNH and being associated with various short-term post-operative morbidities; still there is no available data about assessment of its immediate outcome. The study aims at providing data about intra-operative and immediate post-operative outcomes of TURP and factors related to the outcome.

Objectives: To assess immediate outcome of Transurethral resection of prostate at MNH and factors associated with outcome.

Methodology: Hospital based cross-sectional study. The study was conducted on 138 patients at Muhimbili National Hospital (MNH) from April 2018 to January 2019 obtained by convenient sampling of patients who underwent TURP during the study period. The Inclusion criteria: All admitted patients with BPH who underwent TURP and follow up for 7 days or until discharge whichever occurred earlier. Exclusion criteria: Patients with BPH who underwent TURP but had previous history of TURP. Data was collected using a standardized pre-tested English questionnaire that was filled by research assistants. Data was managed and analyzed by using SPSS program version 24 and association between variables was determined by using Chi-squared test or Fisher's exact test. Ethical clearance was obtained from the MUHAS research and publication committee and MNH research and publication committee.

Results: The study involved 138 patients with BPH who underwent TURP at MNH between April 2018 and January 2019. The mean, (range) age of patients was 68.95 ± 8.66 years, (48 – 94 years). Incidence of co-morbidity was found to be 46.4%. The mean, (range) prostate size by abdominal pelvic ultrasound was 67.87 ± 32.14 grams, (21.1 – 270grams). The mean resection time, (range) was 60.65 ± 14.81 minutes, (30 – 105 minutes). Incidence of immediate post-operative morbidity and mortality was found to be 28.3% and 0.7% respectively. Majority of patients (93.5%) were able to void per urethra after trial of voiding. The average days with indwelling catheter was 3.52 ± 1.32 days and the average hospital stay was 3.64 ± 1.21 days. Hypertension and diabetes have shown to influence outcome of voiding post TURP by increasing the risk of failure to void with statistically significant difference.

Conclusion: Despite TURP being the gold standard in management of obstructive BPH yet it is associated with a number of complications, Clot retention being the predominant one at MNH. Hypertension and diabetes have been shown to influence negatively immediate outcome of TURP. The presence of low rate of blood transfusion, low incidence of TUR syndrome, short hospital stay and duration of catheterization and high rate of successful voiding per urethra still make TURP surgery a good option for obstructive BPH at MNH.

Key words: BPH, TURP, Outcome, Muhimbili

Recommendations:

- Surgeons should try their best to achieve homeostasis intra-operatively to reduce the complication of clot retention and decrease further the need of blood transfusion since blood is a scarce resource.
- There is a need of having TURP protocol which will help to increase appropriate care to patients such as proper irrigation, duration of indwelling catheter among others. This will help to reduce unnecessary complications. The presence of TURP protocol will be of great help to those new to the department and patients as well since they will be in a good environment to get a proper care.

- Patients with hypertension and diabetes who undergo TURP need a close monitoring in terms of their blood pressure and blood glucose level since these co-morbidities have shown to associate negatively with immediate outcome of TURP.
- A long follow-up study should be done to assess long-term complications of TURP and the effect of hypertension and diabetes on BPH management.

TABLE OF CONTENTS

CERTIFICATION	i
DECLARATION AND COPYRIGHT	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
ABSTRACT	v
TABLE OF CONTENTS	viii
LIST OF TABLES	x
LIST OF ABBREVIATIONS	xi
DEFINITION OF TERMS	xii
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Literature Review	5
1.2 Problem Statement	10
1.3 Rationale	11
1.4 Research Questions	11
1.5 Objectives	12
1.5.1 Broad Objective	12
1.5.2 Specific Objectives	12
CHAPTER TWO	13
2.0 METHODOLOGY	13
2.1 Study Design	13
2.2 Study Area	13
2.3 Study Population	13
2.4 Inclusion Criteria	14
2.5 Exclusion Criteria	14
2.6 Study Duration	14
2.7 Sampling Technique	14
2.8 Recruitment procedure	14

2.9 Sample Size Estimation	14
2.10 Data Collection	18
2.11 Data management and analysis.....	19
2.12 Ethical Clearance	20
2.13 Dissemination of findings.....	20
CHAPTER THREE.....	21
3.0 RESULTS	21
CHAPTER FOUR	29
4.0 DISCUSSION.....	29
CHAPTER FIVE	34
5.1 Conclusion	34
5.2 Recommendations.....	34
5.3 Study Limitations.....	35
5.4 Mitigation of the limitations	35
REFERENCES	36
APPENDICES	40
Appendix 1: Data Collection Tool.....	40
Appendix 2: Consent Form (English Version)	43
Appendix 3: Consent Form (Kiswahili Version).....	45
Appendix 4: Tables of results showing factors affecting immediate outcome of TURP.	47

LIST OF TABLES

Table 1:	Summary of results.....	21
Table 2:	Profile of patients who underwent TURP at MNH.....	22
Table 3:	Intra-operative outcome of patients who underwent TURP at MNH.....	23
Table 4:	Immediate post-operative outcome of patients who underwent TURP.....	24
Table 5.1:	Factors influencing voiding per urethra post TURP.....	26
Table 5.2:	Factors influencing incidence of clot retention post TURP.....	27
Table 5.3:	Factors influencing post TURP blood transfusion.....	28

LIST OF ABBREVIATIONS

BOO	Bladder Outlet Obstruction
BPH	Benign Prostate Hyperplasia
BT	Blood Transfusion
BUN	Blood Urea Nitrogen
CB	Continuous Bladder Irrigation
CI	Confidence Interval
DRE	Digital Rectal Examination
FBP	Full Blood Picture
LUTS	Lower Urinary Tract Symptoms
MMed	Master of Medicine
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
RR	Risk Ratio
TUR	Transurethral Resection
TURP	Transurethral Resection of the Prostate
UTI	Urinary Tract Infection

DEFINITION OF TERMS

Immediate outcome: treatment outcome within a period of one week.

TURP: surgical procedure that involves removal of prostate adenoma via an endoscopic approach through the urethra without external skin incision.

Pre-operative clinical parameters include patient's bio data, duration of illness, indication of TURP, Prostate size, voiding status at admission, Patient's co-morbidities.

Post TURP Clot retention: urinary retention due to blockage of urethral catheter by blood clot during post-operative period before removal of urethral catheter necessitating bladder evacuation either in the ward or theatre.

Failure of void: failure to voiding per urethra after removal of urethral catheter post-TURP.

Failure of Medical therapy: Using medical therapy for at least one year without significant relief of LUTS.

Intra-operative outcome: Outcome of TURP from the beginning of surgery to the end of it.

CHAPTER ONE

1.0 INTRODUCTION

Benign prostate hyperplasia (BPH) is a common cause of lower urinary tract symptoms in aging men(1)(2). It occurs as a result of proliferation of smooth muscle and epithelial cells within the prostatic transition zone(2). It can simply be explained as hyperplasia of the prostate gland. Many men who are older than forty years develop histologic hyperplasia of the prostate though not all develop LUTS(1)(2)(3).

The underlying cause of benign prostate hyperplasia is not yet known, since there is no cause and effect relationship that has been established so far(1). Benign prostate hyperplasia histopathologically is characterized by an increased number of epithelial and stromal cells in the periurethral area of the prostate, and thus it is correctly referred to as hyperplasia rather than hypertrophy which is a term usually found in the older literature(1)(2)(4).

It is not yet clear whether the increase in the number of cells is due to epithelial and stromal proliferation or due to impaired programmed cell death leading to cellular accumulation (1). There are number of hormones, growth factors and neurotransmitters that have been thought to play a role either singly or in combination in the etiology of the hyperplastic process(1). Androgens and estrogens are hormones that tend to inhibit the rate of cell death. Development of BPH requires the presence of testicular androgens during prostate development, puberty and aging(1)(2). It has been observed that patients who are castrated before puberty or who are affected by a variety of genetic diseases that impair androgen action or production don't develop BPH(1)(5).

The prostate has a peculiar characteristic; it responds to androgens throughout life unlike other androgen dependent organs with an exception of seminal vesicle(1). Scientists think that prostate hyperplasia may be due to imbalance between cell proliferation and cell death.

BPH has a complex pathophysiology that can't be explained easily. It is believed that prostatic hyperplasia in the periurethral area causes an increase in urethral resistance leading to compensatory changes of the urinary bladder functions(1). Human prostate has one unique

feature that is the presence of the prostatic capsule which plays significant role in increasing urethral resistance during prostatic hyperplasia(1). The capsule transmits the pressure that is caused by tissue expansion to the urethra thus leading to an increase in resistance. Also dynamic urethral resistance and anatomic pleomorphism play part in pathophysiology of BPH rather than absolute size of the gland(1)(2).

The clinical symptoms of BPH are due to bladder outlet obstruction and obstruction –induced changes in detrusor function, compounded by age-related changes in both bladder and nervous system function. The enlarged prostate gland is said to contribute to overall lower urinary symptoms (LUTS) complex via at least two routes; direct bladder outlet obstruction (BOO) from the enlarged gland (static component) and from increased smooth muscle tone and resistance within the enlarged gland (dynamic component)(2).

Symptomatic patients of BPH present with LUTS which include symptoms such as urgency, frequency, nocturia, and urge incontinence which are due to detrusor over activity and straining, hesitency, weak stream, intermittency, prolonged micturition, terminal dribbling, and sense of incomplete emptying which are due to physical presence of BOO(2). These symptoms can also be grouped as Obstructive and irritative symptoms where by obstructive symptoms involve those related to voiding phase and irritative symptoms are those related to storage phase.

The obstructive symptoms are due to bladder outlet obstruction while Irritative symptoms are due to destrutor dysfunction(2).

Benign prostate hyperplasia is associated with other complications such as acute urinary retention, renal insufficiency, development of gross hematuria, bladder calculi, urinary incontinence and recurrent urinary tract infection(2).

LUTS can also be caused by other pathologies such as urinary bladder infection, bladder stones, and bladder cancer. It is common for men to have BPH without having LUTS and vice-versa(1)(6)(2).

Clinical diagnosis of BPH involves history of LUTS and DRE findings which show enlarged prostate, firm, with smooth surface (1)(2).

Investigations that are done for a patient with BPH include renal function tests, Full blood count, serum electrolytes, urinalysis, serum PSA, abdomino-pelvic ultrasound (1). Renal function tests and serum electrolytes help to understand the status of the kidneys whether the patient has obstructive uropathy or not. Full blood count gives detail about hemoglobin level, white blood cell count as to know whether the patient is anemic and if he has infections which are complication of BPH (1)(2).

Abdomino-pelvic ultrasound gives details about the kidney, ureter, urinary bladder and the prostate. It gives details about hydronephrosis, hydroureter and urinary bladder stone which are complications of BPH. Also it gives details about the prostate size, homogeneity/heterogeneity, nodulation and volume(2).

Management options of BPH include watchful waiting, medication and surgery. Medical therapy involves the use of alpha blockers such as tamsulosin, alfuzosin, use of 5-alpha reductase inhibitors such as finasteride and dutasteride, use of anticholinergic agents such as oxybutynin and combination therapy(2).

In surgical management of BPH, operations can basically be classified as closed methods and open methods(7).

Closed methods of operations of BPH include: Transurethral resection of the prostate (TURP), Transurethral incision of the prostate (TUIP), Transurethral holmium laser ablation of the prostate(HoLAP), Transurethral holmium laser enucleation of the prostate(HoLEP), Holmium laser resection of the prostate(HoLRP), Photoselective vaporization of the prostate(PVP) and Transurethral vaporization of the prostate (TUVP)(2)(7).

There are two types of TURP, namely Monopolar TURP and Bipolar TURP. Monopolar transurethral resection of prostate (M-TURP) is considered the gold standard for the management of bladder outlet obstruction due to benign prostatic hyperplasia. Its newly

introduced modification is bipolar TURP (B-TURP) which promises to overcome most prominent shortcomings of monopolar TURP, namely bleeding and dilutional hyponatremia (8).

Monopolar TURP uses hypotonic irrigating fluids such as dextrose 5% during resection which poses high risk of dilutional hyponatremia due to excessive absorption of irrigating fluid while Bipolar TURP uses isotonic irrigating fluids such as normal saline hence eliminating the risk of dilutional hyponatremia.

Also there are minimally invasive therapies such as transurethral needle ablation (TUNA) and transurethral microwave thermotherapy (TUMT) (2).

Open methods include the following: Retropubic (Millin's) prostatectomy, Transvesical (Freyer's) prostatectomy and Transperineal (Young's) prostatectomy (7).

Open prostatectomy is preferred for prostate volume greater than 80 to 100mls (2). If prostate volume is less than 80ml; TURP becomes the best choice of surgical management of BPH.

Transurethral resection of the prostate (TURP) still remains the gold standard modality of surgical treatment of obstructive lower urinary tract symptoms due to BPH (1)(6)(9)(10). It is one of the most commonly performed surgeries by urologists. It has played an important role in the modern era of BPH management.

It is among the earliest endoscopic procedure in urology. TURP is associated with certain complications such as TUR syndrome, bleeding requiring transfusion, clot retention, perforation of prostatic capsule, failure to void, urosepsis, incontinence, urethral stricture, retrograde ejaculation, bladder neck stenosis, erectile dysfunction among others (11)(6).

Indications for surgical management of BPH include; recurrent urinary tract infection, urine retention, bladder calculi, recurrent hematuria, and renal insufficiency due to BPH (11)(1).

Absolute indications of TURP in patients with obstructing prostate include acute urinary retention, recurrent urinary tract infection, recurrent hematuria and azotemia (12).

1.1 Literature Review

TURP is a common surgical procedure in urology. It is an appropriate and effective primary surgical therapy in men with moderate to severe LUTS and/or who are significantly bothered by these symptoms. TURP involves the surgical removal of prostate adenoma via an endoscopic approach through the urethra without external skin incision (2).

TUR syndrome is a unique complication of TURP; it is a dilutional hyponatremia that occurs when irrigating fluid is absorbed into the bloodstream. Complications of TURP that have been reported in more than 5% of patients include: erectile dysfunction; irritative voiding symptoms; bladder neck contracture; the need for blood transfusion; UTI; and hematuria (11). Other complications include clot retention, failure to void etc.

SUCCESS OF TURP COMPARED WITH OTHER PROCEDURES

TURP has been the gold standard for treatment of BPH for a long-time. The first TURP was performed by Guyon at the Necker Hospital in Paris in 1901. This treatment modality has replaced open prostatectomy as the procedure of choice for more than 95% of patients of BPH (13).

The outcome of TURP has been comparable to the outcome of new treatment modalities of BPH such as Transurethral vapor resection of the prostate (TUVRP), holmium laser enucleation of the prostate (HoLEP), transurethral microwave thermotherapy (TUMT) (13)(14).

TURP has been proven to be safe and effective as treatment modality for prostate size up to 150gm, contrary to the popular belief that TURP should be used for prostate size less than 80gm(15)(16).

TURP has short operating time compared to open prostatectomy(17) and it is associated with short hospital stay(18). Also Open prostatectomy is subjected to more blood transfusion than TURP (17).

TUR SYNDROME

A study done by Manikandan et al showed cumulative short-term post-operative significant morbidity was 17.5% and TUR syndrome was observed in 1.4% of patients(19). This finding is comparable to the study done by Oliver et al which showed that TUR syndrome occurred in 1.4% and cumulative short-term morbidity was 11.1% (20). A study done by Ben et al showed that there were no cases of TUR syndrome (21). According to the study done in Nepal by Shrestha et al, TUR syndrome occurred in 5% of patients where by in 1% TUR syndrome occurred during resection and cumulative short-term post-operative morbidity was 10% (6). A study done by Chatterjee et al showed that 5.5% of patients developed symptomatic hyponatraemia. 0.8% had TUR syndrome which correlated strongly with large gland size (3.6 times mean gland size)(22).

NEED OF BLOOD TRANSFUSION

In a study done at KCMC by Aneth et al which enrolled and reviewed a total of 72 case notes of patients with Benign prostate enlargement who underwent TURP in a period of one year, the majority of the patients, 63(86.7%) with prostate weight above 41 grams had more blood loss accompanied with prolonged resection time of more than 60 minutes compared with those with prostate weight less than 40grams. Most of their patients 49(68.1%) were transfused one to two unit(s) of whole blood depending on indication(s)(4). A study done by Ben et al showed that twenty nine out of 117 patients (24.8%) required blood transfusions (21) while a study done by Oliver et al showed 2.9% of patients presented with bleeding requiring transfusions(21). In a study done Mteta et al, it was revealed that one hundred and twenty eight out of 220 patients who underwent TURP were transfused, giving a blood transfusion rate of 58.2% (10). The mean amount of whole blood transfusion was 1.2 units with a range of 1-4 units (10).

The main determinants of blood transfusion were prostate resection greater than 40grams, preoperative Hb less than 11g/dl and the experience of the surgeon (10). A study done by Manikandan et al showed that 29 patients (6.49%) required blood transfusion intraoperatively or in the immediate post-operative period (19). A study done by Chatterjee et al showed that 0.01% of patients who underwent TURP required blood transfusion (22).

CLOT RETENTION

Clot retention was observed in 10 % of patients participating in a study conducted in Nairobi by Dan which looked on complications of prostatectomy after Open prostatectomy and TURP where by TURP accounted for 19% of all cases in the study(7). A study done by Snezana et al, showed that hematuria with clot retention, occurred in 24/48 (50%) of patients who suffered complications (23). A study done by Manikandan et al in India revealed that 23 patients (5.5%) had bleeding with clot retention in the immediate postoperative period, out of these, three required re-coagulation for hemostasis, and the remaining could be managed conservatively (19). A study done by Chatterjee et al revealed that 4.28% developed clot retention and 2.5% required cystoscopic fulguration of bleeders(22).

FAILURE TO VOID

According to the study done by Ben et al, whereby a total of 117 patients with BPH were operated by TURP; eight patients (6.8%) failed their trial of voiding(21). A study done by Oliver et al showed that failure to void occurred in 5.8% of patients with BPH who underwent TURP(20). In a study done by Reynard et al, 12% of men failed to void after TURP on the initial trial without a catheter (24). Ten percent of patients with acute retention (painful inability to void, urine volume less than 800 mL), 38% with chronic retention (maintenance of spontaneous voiding, bladder volume greater than 500 mL), and 44% with acute on chronic retention (painful retention, urine volume greater than 800 mL) failed to void after TURP (24). Only 1% of patients required management by long-term catheterization (24). It was found that failure to void on catheter removal was not related to age or prostate histologic findings (24). A study done in Nepal by Shrestha et al showed that the most relevant postoperative complication was failure to void (24%) (6). A study done in India by Manikandan et al showed that 16 (3.85%) patients could not void after the first trial of catheter removal and required re-catheterization (19). All the patients who failed on first catheter removal were discharged with catheter in situ and were reviewed after one week (19). Of these 16 patients, 12 voided in the next trial of voiding (19). The remaining 4 underwent cystoscopic evaluation and required re-resection of residual apical tissue, followed by successful trial of voiding (19).

Most of the patients with unsuccessful first trial without catheter had relatively larger size (70% of them had prostate larger than 40gms) of prostate (19). A study done Ali et al revealed that Out of 315 patients, 26 (8.3%) failed to void after TURP. The mean age of patients was 67 (range 57 - 92) years (25).

The causes of failure to void after the catheter removal were: hypotonic bladder (10 / 26, 38%), persistent infra-vesical obstruction (9 / 26, 35%), diabetic neuropathy (4 / 26, 15%), end stage renal failure neuropathy (1 / 26, 4%) and old age (2 / 26, 8%). Twenty one out of twenty six (80.7%) patients who failed to void presented with acute on chronic or chronic urinary retention(25). They concluded that the etiology of failure to void post-TURP is multi-factorial but is more common in patients presenting with acute on chronic or chronic urinary retention secondary to hypotonic bladder, diabetic neuropathy and occasionally very old age (25). According to Chatterjee et al in their study they found that 5.5% failed to void in the immediate post op period, which had an association with diabetes (odds ratio-6.32, Risk ratio-4.39) but 90% of them eventually voided (22).

DAYS WITH INDWELLING URETHRAL CATHETER AND HOSPITAL STAY

In a study done by Altaf Khan et al with the title “Day care monopolar transurethral resection of prostate: Is it feasible?” whereby there were two groups, one group involved day care patients who were admitted on day of surgery and discharged the same day after the removal of catheter and the other group discharged on third day post TURP. Mean duration of catheterization in day care was short at 4.28 h in 59 patients. In controls, the average duration of catheterization was 26.78 h. The outcome was considered successful in 59 of 60 patients (98.33%) who were included in day care, as the catheter was removed successfully and they were discharged within 12 h. One patient had retention of urine due to clots and he was recatheterized and the catheter was removed 24 h after TURP (26).

In a study done in Iraq by Mahmood and Aghaways about Safety of Overnight Hospitalization after Transurethral Resection of Prostate, they found that among the forty patients whose catheters were removed on first postoperative day, 38 patients (95%) voided successfully, and were discharged on the same day. However, two out of forty patients (5%) were recatheterized

due to urethral discomfort during micturition. The catheter was removed on the next day. Mean overall duration of catheterization was 18.36 hours, and overall length of patient hospitalization was 21.68 hours. They concluded that overnight hospitalization and early catheter removal after transurethral prostatectomy are an appropriate, safe and effective way of patient care with minimal morbidity (27).

A study done by Madduri et al comparing Monopolar versus bipolar transurethral resection of prostate for benign prostatic hyperplasia found Mean postoperative catheter (h, SD) 53.71 ± 12.53 and Mean hospital stay (days) 3.65 ± 0.76 in monopolar TURP while in bipolar TURP, mean postoperative catheter was (h, SD) 53.33 ± 11.59 and mean hospital stay (days) was 3.90 ± 0.88 (8).

OTHER COMPLICATIONS

Other complications that have been noted in patients with BPH who underwent TURP in different studies include pyrexia ,urinary bladder perforation, prolonged- post operative admission (> 7 days), hematuria, significant urinary tracts infections, and death (6)(7)(19)(20)(21)(23).

1.2 Problem Statement

Different studies have shown that TURP is associated with short-term post-operative morbidities such as; TUR syndrome, blood transfusion, failure to void and clot retention (4)(11)(22)(25). TUR syndrome correlates strongly with large prostate gland size. Prostate gland with large size (>41grams) is associated with more blood loss and prolonged resection time of more than 60mins. Blood transfusion has been prevalent in most of the studies done about outcome of TURP (4)(9). There has been no clear indication for blood transfusion except for anesthetist's /anesthesiologist's requirement (4). Failure to void after initial removal of catheter has been reported in various studies assessing outcome of TURP.

Most of patients with BPH at MNH who need TURP as mode of treatment present with lower urinary tract symptoms (LUTS) associated with significant post-void residual volume. Some of them have suprapubic catheter due to urine retention secondary to bladder outlet obstruction whereby there was failure of urethral catheterization. Most of these patients who undergo TURP are elderly people because BPH affects commonly elderly due to its pathophysiology. Elderly people have a lot of comorbidities such as diabetes, hypertension, heart diseases, stroke and others that in one way or another may affect outcome of TURP. All complications may increase hospital stay and treatment cost.

Currently there is no available data about assessment of immediate outcome of TURP at MNH. So regardless of TURP being among the common procedures done in department of Urology at MNH and being associated with various short-term post-operative morbidities, still there is no data about its immediate outcome at MNH.

1.3 Rationale

Surgical procedures need to be assessed so as to understand their advantages and shortcomings. TURP is a commonly performed surgical procedure in urology department at MNH.

The aim of this study is to assess intra-operative and immediate post-operative outcomes of TURP and factors related to the outcome.

This study will enable us to know the incidence of TUR syndrome, blood transfusion, failure to void and clot retention among patients who have undergone TURP. Also it will give details about common indication for TURP at MNH and co-morbidities of patients who undergo TURP. For case of blood transfusion, it will give us details about transfusion in patients who underwent TURP that enable us to make proper utilization of blood which is a scarce resource and sometimes associated with hazardous complications.

Hence, the study will provide data about immediate outcome of TURP at MNH that will help in improving health care of our patients with BPH.

1.4 Research Questions

1. What are the indications of TURP at MNH?
2. What are the intra-operative and immediate post-operative outcomes of TURP at MNH?
3. What are patient's co-morbidities associated with outcome of TURP at MNH?
4. What are other factors associated with adverse outcome?

1.5 Objectives

1.5.1 Broad Objective

To assess immediate outcome and associated factors of patients undergoing Transurethral resection of prostate at MNH.

1.5.2 Specific Objectives

1. To assess intra-operative outcomes of patients undergoing TURP at MNH
2. To assess immediate post-operative outcomes of patients undergoing TURP at MNH.
3. To determine factors associated with immediate outcome of patients undergoing TURP at MNH.

CHAPTER TWO

2.0 METHODOLOGY

2.1 Study Design

Prospective Hospital based cross-sectional study.

2.2 Study Area

This study was conducted at Muhimbili National Hospital (MNH). MNH is a National Referral Hospital and University Teaching Hospital for MUHAS with bed capacity of 1,600 beds, attending 1,000 to 1,200 outpatients weekly, admitting 1,000 to 1,200 inpatients per week. It is located in Dar es Salaam, Ilala District, Upanga Ward. The study involved urology patients admitted at Kibasila wards 14 and 16 and Sewahaji wards 17 and 18.

There are thirteen urologists working at MNH, five urologists from department of surgery-MUHAS and eight urologists from department of urology-MNH. Moreover there are urology residents, registrars and interns who are involved in daily care of patients. The department of Urology at MNH has two firms, firm I and firm II. Firm I admits male patients in ward 14 Kibasila, and firm II admits male patients in ward 17 Sewahaji while wards 16 and 18 are shared by both firms for private patients and patients with health insurance. Firm one has outpatient clinic on Tuesday and operates on Wednesday, Thursday and Friday while firm two has outpatient clinic on Wednesday and operates on Monday, Tuesday and Friday. There are private clinics for individual urologist from Monday to Saturday.

The department of urology at MNH has endoscopic instruments for various endoscopic procedures/surgeries. It has instruments for video-monopolar TURP which is used for endoscopic surgical management of Obstructive BPH.

2.3 Study Population

All patients who underwent TURP during the study period.

2.4 Inclusion Criteria

All admitted patients with BPH who underwent TURP at MNH and were follow-up for 7days post operation or until discharge whichever occurred earlier.

2.5 Exclusion Criteria

Patients with previous history of TURP were excluded.

2.6 Study Duration

April 2018 to January 2019.

2.7 Sampling Technique

Convenience sampling was used whereby all patients with obstructive BPH who underwent TURP were consecutively recruited until the sample size was reached.

2.8 Recruitment Procedure

Patients were recruited from urology wards (wards 14 & 17) and wards 16 & 18. All patients admitted and underwent TURP at MNH were recruited the following day post TURP after informed consent.

Recruited patients were asked questions from questionnaires and other information about them were obtained from their files.

2.9 Sample Size Estimation

The sample size was calculated using a single proportion Formula

$$n = z^2 p (100 - P) / \epsilon^2$$

Where: n = Minimum sample size designed,

z = the point on standard normal deviation corresponding to 95% Confidence Interval, which is 1.96

p = the proportion of morbidity of TURP which is 10% (Shrestha B. et al, Oliver R. et al)

ϵ = Margin of error set at 5 %

$$n = (1.96)^2 \times 10(100-10)/25 = 138$$

The number of patients with BPH who underwent TURP that were recruited for the study was 138

TURP PROCEDURE AT MNH

TURP is an elective endoscopic procedure done at MNH to patients with BPH with prostate size less than 80gm presenting with bothersome LUTS and other indications. The type of TURP done at MNH is monopolar TURP and uses dextrose 5% as irrigating fluid.

Patients are usually admitted one day prior to the procedure for pre-operative preparations. Prior to admission patients undergo various blood and imaging investigations as outpatients and they attend anesthesiology clinic for assessment. Blood investigations that are done routinely include FBP, Creatinine, BUN, Serum electrolytes and imaging investigations include abdominal pelvic ultrasound, ECHO, ECG.

On the day of admission blood is drawn for checking FBP, Creatinine, BUN, Serum electrolytes, ABO & X-match and usually two units of whole blood is prepared for intra-operative use if needed. Usually anesthesiologists don't agree to give anesthetic drugs until they are sure that at least one unit of whole blood is available regardless of Hb level. Patients sign informed consent one day prior to the procedure and Intravenous antibiotics commonly IV ceftriaxone is prescribed one hour prior the procedure intra-operatively.

TURP is commonly done under spinal anesthesia. The patient is positioned in lithotomy position with the buttocks just off the end of the table after spinal anesthesia and draped aseptically. The perineum is not shaved but scrubbed for 5 minutes with a germicidal soap, Dettol is commonly used.

Equipments used in TURP include; sheath, supplementary sheath, obturator, working elements, telescope, camera, evacuator, irrigating fluid system. A reservoir is placed 60–70 cm above the level of the symphysis (irrigation pressure 60–70 cmH₂O).

Insertion of the instrument:

The metal sheath of the resectoscope is generously lubricated with a conductive jelly. An obturator is placed through the sheath to provide a smooth, blunt tip for easy passage through the fossa navicularis and anterior urethra. The instrument should gently enter the urethra under its own weight, to make the introduction as atraumatic as possible. If

there is resistance to the passage, any force should be strictly avoided. If the meatus is narrow, or there is a stricture of the meatus or the anterior urethra, a 'blind' internal urethrotomy up to 30 F with the Otis urethrotome is recommended. Further passage is either blind with the obturator inside the sheath or under direct vision using the 0° endoscope and the video camera.

Gentleness and care are essential to avoid urethral strictures. Via the video monitor the bulbar urethra, the external sphincter and the prostatic urethra with the prostatic lobes and the verumontanum are inspected. Then a systematic evaluation of the entire bladder surface using angular optical lenses is mandatory. The surgeon usually does a preliminary endoscopy confirming whether it is true that the prostate is enlarged and causes bladder outlet obstruction, getting the bearings, ascertaining land marks, searching for additional lesions in the lower urinary tract.

Technique of resection:

TURP is performed while a surgeon is sitting on a chair. After the preliminary endoscopy, the bladder is filled with approximately 150 mL of irrigation fluid, dextrose 5%. Resection usually begins at the proximal portion of the middle lobe at the 6 o'clock position. The resectoscope is placed just proximal to the verumontanum and the resection carried out always controlling the endpoint of each cut. It is necessary to be aware of the position of the verumontanum to see that the lower part of the cut is not extending below this level, otherwise damage to the sphincter mechanism may occur (28).

Resection should be carried out with long cuts towards the verumontanum. A large overhanging middle lobe should be resected with special care. It is important to make short cuts in the region of the bladder neck, as the surgeon might not be aware that he or she is cutting down the trigone towards the ureteric orifices. Subsequent cuts are made down to the peripheral tissue, which is recognized as a rather fibrous structure compared with the granular appearance of the prostatic adenoma(28).

After resecting the middle lobe from the 7 to 5 o'clock positions, the resection is carried to both sides of the verumontanum with particular care. When this stage is completed, the surgeon should pull the resectoscope into the urethra, just distal to the verumontanum, and note that there is no falling and obstructing tissue. During this stage, the surgeon must always be aware of the position of the external sphincter to avoid any sphincter lesion(28).

Resection in smaller adenomas is now carried directly to the side lobe. It depends on the preference of the surgeon whether to begin on the left and then resects the other side, or vice versa(28).

Care must be taken to make subsequent long cuts next to each other to achieve a smooth surface. First the proximal parts of the prostatic adenoma must be completely removed, then the remaining apical portion is resected with particular care.

At the end of the procedure, resected tissues (chips) are removed by using evacuator and Wadil test is performed to assess the stream of urine. Then three ways catheter 22/20Fr is inserted and connected to irrigation fluid, normal saline.

Post-operative orders include IV antibiotics commonly IV ceftriaxone for 3days, IV fluid DNS/NS 3L for 24 hours, Inj Pethidine or tramadol or diclofenac or combination for 24 hours, Inj Furosemide 40mg 8hrly for 24 hours (depends on BP at the end of the procedure), Continuous bladder irrigation with NS corresponding with the need, and Keep urethral catheter for at least 2days.

Post-operative care of patients in the ward:

Day 1 Post-TURP, continuous bladder irrigation is stopped if urine is clear. IV fluids are stopped and patients are encouraged to drink a lot of fluids eg water. IV antibiotics continue and patients are given oral analgesic if they feel pain.

Day 2 Post-TURP, patients continue with IV antibiotics and encouraged to continue taking a lot of fluids, urethral catheter may be removed if a patient gets clear urine.

Day 3 Post-TURP, Most of the time urethral catheter is removed and trial of void is allowed, if it is successful the patient is discharged home. He is seen again at the clinic after two weeks. He is given instructions to follow while at home and precautions to take. If trial of void fails, the patient is re-catheterized again and may be discharged with the catheter for further assessment later at clinic.

2.10 Data Collection

Data was collected using a data collection tool, a standardized pre-tested English questionnaire that was filled by research assistants.

Data was extracted from patients' files/ operation notes, and some information that was missing from patients' file was obtained directly from patients or operating staff.

Personal particulars, preoperative, intraoperative and post-operative clinical information of the study subject were entered into a data collection tool.

This included subject's socio-demographic data, complains, duration of illness prior to TURP, indication for TURP, voiding status at admission, co-morbidities, intraoperative outcome, immediate post-operative outcome.

Patient's outcome included; TUR syndrome, Perforation of prostatic capsule, need of blood transfusion during & post TURP, clot retention before removal of catheter, duration of continuous bladder irrigation, Post-TURP voiding status after initial removal of catheter, duration of hospital stay, duration of catheterization

Complications were determined by performing clinical assessments, hematological or imaging investigations upon observation of patient's altered general condition.

Patients were followed up until day of discharge or until 7days post-TURP, whichever occurred earlier.

2.11 Data management and analysis

The Study had the following variables;

Independent variables: Patient's biodata; Age, duration of illness prior to TURP in months, identified indications for TURP, Prostate size, patient's co-morbidities and voiding status at admission.

Dependent variables

- ✓ Intra-operative outcome: TUR syndrome, perforation of prostatic capsule, need for blood transfusion.
- ✓ Immediate post-operative outcome: need for blood transfusion, clot retention, duration continuous bladder irrigation, failure to void after initial removal of urinary catheter, hospitalization duration, and number of days with indwelling urethral catheter.

Data has been managed and analyzed by using SPSS program version 24.

Data quality was checked on daily basis, sorted, coded and entered into the program.

Data analysis has involved;

- ✓ Frequency distribution of patient's pre-operative clinical parameters and frequency distribution of outcome. The following proportions will be determined, proportions of;
- ✓ TUR Syndrome, prostatic capsular perforation, blood transfusion, clot Retention, post-TURP voiding status, common Indications of TURP, common patient's complains, voiding status at admission)
- ✓ Mean of; resection time, duration of CBI, duration of catheterization, duration of Hospital stay, prostate size, duration of Illness, age of patient
- ✓ Cross-tabulations between outcome and pre-operative clinical parameters were analyzed. Chi-squared test/ Fisher's exact test was used for contingency tables. The

following associations were analyzed, association between outcome and; Indication of TURP, Age of Patients, Prostate size, hypertension and diabetes.

An association with P-value less than 0.05 was considered significant.

Data presentation and interpretation have been in form of one variable table, and two ways tables.

2.12 Ethical Clearance

It was obtained from the MUHAS and MNH research and publication committee. Patients' confidentiality was observed during and after the study. No harm was done the patients who were participating in the study. Patients participated voluntarily after getting informed consent.

2.13 Dissemination of findings

The research report will be presented at the Department of surgery and used to produce a Dissertation for MMed degree award, and thereafter disseminated to the Dean School of Medicine and the Director of Postgraduate Studies. Also a manuscript will be prepared for publication.

CHAPTER THREE

3.0 RESULTS

The study involved 138 patients with BPH who underwent TURP at MNH between April 2018 and January 2019. The mean, (range) age of patients was 68.95 ± 8.66 years, (48 – 94 years). Majority of patients had both obstructive and irritative symptoms prior to TURP. A big proportion of patients (85.5%) were voiding per urethra at the time of admission while 14.5% of patients were voiding per urethral catheter and none had suprapubic catheter. Incidence of co-morbidity was found to be 46.4%. The mean, (range) prostate size by abdomino-pelvic ultrasound was 67.87 ± 32.14 grams, (21.1 – 270grams). (Table 1)

The mean resection time, (range) was 60.65 ± 14.81 minutes, (30 – 105 minutes). Incidence of immediate post-operative morbidity and mortality was found to be 28.3% and 0.7% respectively. The average days with indwelling catheter was 3.52 ± 1.32 days and the average hospital stay was 3.64 ± 1.21 days. (Table 1)

Hypertension and diabetes have been shown to separately influence outcome of voiding post TURP by increasing the risk of failure to void with statistically significant difference. Other factors such as age, indications, prostate size, and other co-morbidities were not statistically significant in influencing outcome of TURP.

Table 1: Summary of results

Variable	Minimum	Maximum	Mean	Std. Deviation
Age in years	48	94	68.95	8.66
Duration of illness in month	1	168	18.46	24.29
Prostate Size in grams	21.1	270	67.87	32.13
Resection time in minutes	30	105	60.65	14.81
Duration of CBI in hours	0	168	25.57	22.78
Hospital stay Post TURP in days	2	7	3.64	1.21
Days with catheter	2	7	3.52	1.31

Table 2: Profile of patients who underwent TURP at MNH (N=138)

Variable	Frequency	%
Age Group (N=138, Mean Age= 68.95 ± 8.657, Range = 48 - 94)		
40-50	2	1.4
51-60	15	10.9
61-70	74	53.6
71-80	33	23.9
81-90	12	8.7
90-100	2	1.4
Complaints of patients (N=138)*		
Obstructive symptoms	134	97.1
Irritative symptoms	137	99.3
Both Obstructive & irritative symptoms	133	96.4
Hematuria	13	9.4
Episode of Urine retention	18	13.0
Complications due to BOO	9	6.5
Duration of Illness in Month (N=138)		
<6Month	39	28.3
6-12Months	55	39.9
>12Months	44	31.9
Primary Indication of TURP (N=138)		
Bothersome LUTs	84	60.9
Episode of Urine Retention	18	13
Recurrent Hematuria	1	0.7
Renal insufficiency due to BOO	5	3.6
Bladder Calculi due to BOO	1	0.7
Failure of medical therapy	29	21
Prostate size (N=138, Mean= 67.872 ± 32.1397, Range= 21.1 - 270)		
Size in gm		
<30	2	1.4
30-60	68	49.3
61-90	47	34.1
>90	21	15.2
Patient's Co-morbidity (N=138)*		
Hypertension	56	40.6
Diabetes	13	9.4
Both Hypertension & Diabetes	9	6.5
Stroke	2	1.4
Heart disease	6	4.3
Tumor of the Head of Pancreas	1	0.7
COPD	1	0.7
No co-morbidity	74	53.6

Note; *-percentages do not add to 100 due to multiple response.

Majority of patients (53.6%) were in the age group of 61-70 years while only 1.4% of patients were less than or equal to 50 years.

Most of the patients (71.7%) had symptoms for more than six months.

A big proportion of patients (60.9%) with BPH underwent TURP due to presence of bothersome LUTs.

Majority of patients who underwent TURP had prostate size ranging 30-60grams (49.3%) while 15.2 % of patients had prostate size of > 90grams

A significant proportion of patients (40.6%) reported to be hypertensive followed by 13 patients (9.4%) who were reported to be diabetic. (Table 2)

Table 3: Intra-operative outcome of patients underwent TURP at MNH (N=138)

Variable	Frequency	%
Intra-operative complication (N=138)		
Blood Transfusion	3	2.2
Capsular perforation	1	0.7
TUR syndrome	0	0
Bladder perforation	0	0
Stoppage of operation because of exceeding TURP time	0	0
Death	0	0
No complication	134	97.1
Resection time (N=138, Mean= 60.65 ±14.808 , Range =30 - 105)		
<60 minutes	57	41.3
60 minutes	18	13
>60-90 minutes	60	43.5
>90minutes	3	2.2

Most of patients (97.1%) had good outcome intra-operatively. Incidence of intra-operative morbidity was 2.9 % with no mortality.

In most of the patients resection time was within the standard time for Monopolar TURP except in 2.2% of patients where by TURP went on beyond the standard time. (Table 3)

Table 4: Immediate Post-operative Outcome of patients underwent TURP (N=138)

Variable	Frequency	%
Immediate Post-Operative outcome (N=138)*		
Clot Retention, evacuation in the ward	30	21.7
Clot Retention requiring evacuation in theatre	0	0
Blood transfusion	9	6.5
TUR syndrome	1	0.7
Voiding per urethra after trial of void.	129	93.5
Trial of void not done within the study period.	6	4.3
Failure to void after trial of void.	3	2.2
Death	1	0.7
Duration of CBI in hours (N=138)		
None	1	0.7
≤12 hours	37	26.8
>12-24 hours	86	62.3
>24hours	14	10.1
Indication of Immediate Post-Operative BT (N=9)		
Low Hb	3	33.3
Severe bleeding/blood loss	6	66.7
Number of units of Blood Transfused (N=12)		
1unit	7	58.3
2units	2	16.7
>2units	3	25
Hospital Stay Post –TURP (N=138)		
1-3days	78	56.5
4-7days	56	40.6
>7days	4	2.9
Days with indwelling u/catheter Post-TURP (N=138)		
1-3days	78	56.5
4-7days	55	39.9
>7days	5	3.6

Note;* -percentages do not add to 100 due to multiple response.

Majority of patients (93.5%) were able to void per urethra after trial of void and 2.2 % of patients failed to void after trial of void while 6 patients (4.3%) trial of void was not done because one patient died on day two post TURP before the trial of void and Five patients stayed with catheter beyond the study duration(>7days).

Among these five patients, one patient was discharged with catheter due to capsular perforation and 4 patients stayed in the ward for more than 7days with catheters, one patient had TUR syndrome, two patients had recurrent clot retention and one patient underwent TURP and cystostomy for removal of dislodged ceramic part of sheath during TURP.

Clot retention was the leading negative immediate post-TURP outcome (21.7%) but all cases were managed in the ward without the need of going to theatre. TUR syndrome occurred in 0.7% of patients who underwent TURP and mortality was 0.7%. A significant number of patients (89.1%) had continuous bladder irrigation for ≤ 24 hours while only 0.7% of patients didn't require continuous bladder irrigation immediately post TURP. (Table no.4)

Most of patients (6 out of 9) who got blood transfusion immediately post TURP were due to severe bleeding. No patient was transfused merely due to anesthesiology's request.

Among patients who got blood transfusion, (58.3%) were transfused 1 unit of blood.

More than a half of patients who underwent TURP (56.5%) stayed in the hospital post TURP for 1-3 days, only 2.9 % of patients stayed for > 7 days.

Majority of patients (56.5%) stayed with indwelling urethral catheter post TURP for 1-3 days, only 3.6% patients stayed with indwelling catheter for > 7days. (Table 4)

Table 5.1: Factors influencing voiding per urethra post TURP

Variable	Failure of void, n (%)	Voiding per urethra, n (%)	Total, n (%)	P value	RR (95%CI)
Age group					
≥70	5 (8.2)	56 (91.8)	61 (100)	0.51	1.58 (0.44-5.63)
< 70	4 (5.2)	73 (94.8)	77 (100)		
Prostate size in grams					
> 75	2 (5.6)	34 (94.4)	36 (100)	1	0.81 (0.18-3.72)
≤ 75	7 (6.9)	95 (93.1)	102(100)		
Indication for TURP					
Complication of BOO	1 (11.1)	8 (88.9)	9 (100)	0.47	1.79 (0.25-12.8)
Severe symptoms	8 (6.2)	121 (93.8)	129 (100)		
Hypertension					
Yes	7 (12.5)	49 (87.5)	56 (100)	0.031	5.13 (1.11-23.77)
No	2 (2.4)	80 (97.6)	82 (100)		
Diabetes					
Yes	3 (23.1)	10 (76.9)	13 (100)	0.04	4.81 (1.36-17.0)
No	6 (4.8)	119 (95.2)	125 (100)		

Patients with hypertension were more associated with failure of void post-TURP compared to non hypertensive patients and the difference is statistically significant with P value < 0.05, RR = 5.13 , 95%CI= 1.11-23.77 (Table 5.1)

Moreover patients with diabetes were also more associated with failure of void post-TURP compared to non diabetic patients and the difference is statistically significant with P value < 0.05, RR = 4.8, 95%CI= 1.36-17.0 (table 5.1)

Table 5.2: Factors influencing incidence of clot retention post-TURP

Variable	Clot retention, n (%)	No clot retention, n (%)	Total, n (%)	P value	RR (95%CI)
Age group					
≥70	15 (24.6)	46 (75.4)	61 (100)	0.47	1.26 (0.67-2.38)
< 70	15 (19.5)	62 (80.5)	77 (100)		
Prostate size in grams					
> 75	9 (25)	27 (75)	36 (100)	0.58	1.21 (0.61-2.4)
≤ 75	21 (20.6)	81 (79.4)	102 (100)		
Indication for TURP					
Complication of BOO	2 (22.2)	7 (77.8)	9 (100)	1	1.02 (0.29-3.63)
Severe symptoms	28 (21.7)	101(78.3)	129(100)		
Hypertension					
Yes	14 (25)	42 (75)	56 (100)	0.44	1.28 (0.68-2.41)
No	16 (19.5)	66 (80.5)	82 (100)		
Diabetes					
Yes	6 (46.2)	7 (53.8)	13 (100)	0.036	2.4 (1.21-4.79)
No	24 (19.2)	101(80.8)	125 (100)		

Patients with diabetes were more associated with Clot retention compared to non diabetic patients and the difference is statistically significant with P value < 0.05. RR=2.4, 95%CI=1.21-4.79 (Table 5.2)

Table 5.3: Factors influencing post TURP blood transfusion

Variable	No Post		Total, n (%)	P value	RR (95%CI)
	Post TURP BT, n (%)	TURP BT, n (%)			
Age group					
≥70	5 (8.2)	56 (91.8)	61 (100)	0.51	1.58 (0.44-5.63)
< 70	4 (5.2)	73 (94.8)	77 (100)		
Prostate size in grams					
> 75	5 (13.9)	31 (86.1)	36 (100)	0.052	3.54 (1.01-12.47)
≤ 75	4 (3.9)	98 (96.1)	102 (100)		
Indication for TURP					
Complication of BOO	2 (22.2)	7 (77.8)	9 (100)	0.11	4.1 (0.99-16.92)
Severe symptoms	7 (5.4)	122 (94.6)	129 (100)		
Hypertension					
Yes	6 (10.7)	50 (89.3)	56 (100)	0.158	2.93 (0.76-11.22)
No	3 (3.7)	79 (96.3)	82 (100)		
Diabetes					
Yes	4 (30.8)	9 (69.2)	13 (100)	0.005	7.69 (2.35-25.14)
No	5 (4)	120 (96)	125 (100)		

Patients with diabetes were more associated with Post-TURP blood transfusion compared to non diabetic patients and the difference is statistically significant with P value < 0.01, RR=7.69 , 95%CI=2.35-25.14 (Table 5.3)

CHAPTER FOUR

4.0 DISCUSSION

TURP is the common procedure done for patients with obstructive BPH. BPH is the disease that affects mostly elderly people. Majority of patients (53.6%) that underwent TURP in this study were in the age group of 61-70years and the mean age was 68.95 years, which is comparable to the studies done by Manikandan et al (19) and Alhasan et al (3).

In this study majority of patients (85.5%) were voiding per urethra at the time of admission while 14.5% of patients were voiding per urethral catheter and none had suprapubic catheter. This is different from the study done by Alhasan et al where by majority of patients (80.1%) were voiding per urethral catheter at presentation and 11 (3%) patients had suprapubic cystostomy (3). The presence of urethral catheter and suprapubic cystostomy indicate the severity of LUTS. Majority of patients (60.9%) who underwent TURP in this study had bothersome LUTs as the primary indication for TURP; the finding is comparable to various other studies (19). This may account for the fact that majority of patients in this study were voiding per urethra at presentation. Also the finding may be due to under utilization of medical therapy of BPH for patients with bothersome LUTs that's why majority were operated.

Hypertension was found to be the leading co-morbidity in this study, in which 40.6% of patient reported to be hypertensive and the same finding was observed in the study done in India by Manikandan et al whereby 75% of patients were hypertensive (19). This might be due to the fact that BPH is the disease of elderly men who also have other co-morbidities, hypertension being one of them.

Most of literatures suggest prostate size of around 75grams or less to be appropriate for TURP while prostate size of above 75grams is appropriate for Open prostatectomy. In this study patients that were operated had prostate sizes ranging 21.1 to 270grams and 26.1% of patients had prostate size more than 75grams, the outcome of TURP was not significantly different between patients with prostate size of 75grams or less and patients with prostate size more than 75grams. The findings are comparable to the studies done by Joshi et al (16) and

Muzzonigro et al (15) which showed that TURP is safe and effective as treatment modality for prostate size up to 150gm. But we don't know the longtime outcome among these patients with small prostate and big prostate who undergo TURP. Also in this study there was no clear documentation in terms of level of resection whether there was complete resection or partial resection of prostatic adenoma. So it is not certain whether those patients with big prostate had complete resection or not.

In this study average resection time was 60.65 minutes with a range of 30-105minutes. The average resection time was within the standard time of resection for monopolar TURP but it has a very wide range. It is comparable to the study done by Alhasan et al whereby the average resection time was 64.1 minutes with a range of 20-120minutes (3). But it was a long time of resection compared to the studies done by Mankandan et al whereby average resection time was 24.5 minutes (range 17-75minutes, Altaf et al whereby average resection time was 36.25minutes (range 5-75minutes), and Sarwar et al whereby the average resection time was 36.68minutes (10-90minutes) (19)(26)(27). In majority of these studies, the mean prostate size was less than 40gm while in this study the mean prostate size was 67.87gm. This may account for a long time of resection in my study. The standard resection time for monopolar TURP is not more than 90minutes but in this study there were patients where resection time exceeded 90 minutes. This may be dangerous to patients because they become at high risk of getting TUR syndrome but it might be due to the fact that some of TURP were performed by trainees since MNH is a teaching institution. The good thing there was no patient who got TUR syndrome for those whose resection time exceeded 90 minutes.

In this study the majority of patients (93.5%) were able void after trial of void post-TURP. Only 3 (2.2%) patients had failure of void after trial of void and they were discharged with urethral catheter for two weeks and 6 (4.3%) patients didn't have trial of void post TURP during the study period because of various reasons. One patient died on day two post TURP before the trial of void, and five patients stayed with catheter beyond the study duration(>7days). Among these five patients, one patient was discharged with catheter due to capsular perforation and 4 patients stayed in the ward for more than 7days with catheters, one patient

had TUR syndrome, two patients had recurrent clot retention and one patient underwent TURP and cystostomy for removal of dislodged ceramic part of sheath during TURP.

The rate of failure to void after trial of void post-TURP in this study is low (2.2%) compared to various studies and hypertension and diabetes have been shown to increase the risk of failure of void post-TURP. (Risk ratio for hypertension-5.12, 95%CI: 1.11-23.77 and diabetes- 4.81, 95%CI: 1.36-17.0)

According to the study done by Ben et al, where by a total of 117 patients with BPH were operated by TURP; eight patients failed their trial of void (21). A study done by Oliver et al showed that failure to void occurred in 5.8% of patients with BPH who underwent TURP (20). In a study done by Reynard M. et al, twelve percent (12%) of men failed to void after TURP on the initial trial without a catheter (24). A study done in Nepal by Shrestha et al showed that the most prevalent postoperative complication was failure to void (24%) (6). A study done in India by Manikandan et al showed that 16 (3.85%) patients could not void after the first trial of catheter removal and required re-catheterization (19). In a study done Ali et al revealed that Out of 315 patients, 26 (8.3%) failed to void after TURP (25).

According to Chatterjee et al in their study they found that 5.5% failed to void in the immediate post op period, which had an association with diabetes (odds ratio-6.32, Risk ratio-4.39) but 90% of them eventually voided (22).

The incidence of TUR syndrome (0.7%) in this study is low compared to other studies except for a study done by Ben et al which showed there were no cases of TUR syndrome (21). A study done by Manikandan et al showed TUR syndrome was observed in 1.4% of patients (19). This finding is comparable to the study done by Oliver et al which also showed that TUR syndrome occurred in 1.4% (20). According to the study done in Nepal by Shrestha et al, TUR syndrome occurred in 5% of patients whereby in 1% TUR syndrome occurred during resection and cumulative short-term post-operative morbidity was 10%(6). A study done by Chatterjee et al showed that 5.5% patients developed symptomatic hyponatraemia and 0.8% had TUR syndrome which correlated strongly with large gland size (3.6 times mean gland size)(22).

In this study the incidence of clot retention was found to be 21.7% and no patient was sent to theatre for evacuation of clots, all cases were managed in the ward. The incidence is higher compared with other studies. Clot retention was observed in 10 % of patients participated in study conducted in Nairobi by Dan which looked on complications of prostatectomy after Open prostatectomy and TURP where by TURP accounted for 19% of all cases in the study(7). A study done by Manikandan et al in India revealed that 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(19).

A study done by Chatterjee et al revealed that 4.28% developed clot retention and 2.5% required endoscopic fulguration of bleeders(22). The differences in incidence of clot retention could be contributed by definition of clot retention as used in various studies. In this study clot retention was defined as urinary retention due to blockage of urethral catheter by blood clot during post- operative period before removal of urethral catheter necessitating bladder evacuation either in the ward or theatre.

The rate of blood transfusion in this study was found to be 8.7%, the rate is low compared to different African studies but high compared to studies done in India and Europe. Majority of transfused patients (58.3%) in the study were transfused one unit of whole blood. In a study done at KCMC by Aneth et al which enrolled and reviewed a total of 72 case notes of patients with Benign prostate enlargement who underwent TURP in a period of one year, majority of the patients, 63(86.7%) with prostate weight above 41 grams had more blood loss accompanied with prolonged resection time of more than 60 minutes compared with those with prostate weight less than 40grams. Most of their patients 49(68.1%) were transfused one to two unit(s) of whole blood depending on indication(s)(4). A study done by Ben et al showed that twenty nine patients required blood transfusions (21) while in a study done by Oliver R. et al showed 2.9% of patients presented with bleeding requiring transfusions(21). A study done Mteta et al revealed that one hundred and twenty eight out of 220 patients who underwent TURP were transfused, giving a blood transfusion rate of 58.2% (10). The mean amount of whole blood transfusion was 1.2 units with a range of 1-4 units (10). This

difference would depend on different criteria for blood transfusion in different institutions or health facility.

The main determinants of blood transfusion were prostate resection greater than 40grams, preoperative Hb less than 11g/dl and the experience of the surgeon (10). A study done by Manikandan et al showed that 29 patients (6.49%) required blood transfusion intraoperatively or in the immediate post-operative period(19). A study done by Chatterjee et al showed that 0.01% of patients who underwent TURP required blood transfusion (22).

In this study, majority of patients 78 (56.5%) stayed in the hospital for 1-3days post-TURP but no patient was discharged on day one post-TURP and only four patients (2.9%) stayed for more than 7 days. The average hospital stay was 3.64 ± 1.21 days.

In a study done in Iraq by Mahmood and Aghaways, overall length of patient hospitalization was 21.68 hours (27) while In a study done by Madduri et al comparing Monopolar versus bipolar transurethral resection of prostate for benign prostatic hyperplasia, mean hospital stay (days) was 3.65 ± 0.76 in monopolar TURP comparable to the finding in this study(8).

In this study, the duration of indwelling urethral catheter post-TURP was variable. Most of patients (56.5%) stayed with urethral catheter for 1-3 days while only five patients (3.6%) stayed with catheter for more than 7 days. The average days with indwelling catheter was 3.52 ± 1.32 days.

In a study done by Altaf Khan et al, the average duration of catheterization was 26.78 h (26)while in the study done in Iraq by Mahmood and Aghaways, mean overall duration of catheterization was 18.36 hours (27).

In a study done by Madduri et al comparing Monopolar versus bipolar transurethral resection of prostate for benign prostatic hyperplasia, mean postoperative catheter was (hour, SD) 53.71 ± 12.53 (8). Duration of catheterization may also be influenced by hospital protocol guidelines. At MNH most urologists prefer to remove urethral catheter day three post- TURP if the outflow without irrigation is clear.

CHAPTER FIVE

5.1 Conclusion

Despite TURP being the gold standard in management of obstructive BPH yet it is associated with a number of complications, clot retention being the predominant one at MNH.

Hypertension and diabetes have been shown to influence negatively immediate outcome of TURP.

The presence of low rate of blood transfusion, low incidence of TUR syndrome, short hospital stay and duration of catheterization and high rate of successful voiding per urethra still make TURP surgery a good option for obstructive BPH at MNH.

5.2 Recommendations

- Surgeons should try their best to achieve homeostasis intra-operatively to reduce the complication of clot retention and decrease further the need of blood transfusion since blood is a scarce resource. Clot retention has been the most common complication among patients post-operatively and increases burden to health care workers taking care of post-TURP patients at MNH. It makes a very busy night for those on night shifts or on call.
- There is a need of having TURP protocol which will help to increase appropriate care to patients such as proper irrigation, duration of indwelling catheter among others. This will help to reduce unnecessary complications. The presence of TURP protocol will be of great help to those new to the department and patients as well since they will be in a good environment to get a proper care.
- Patients with hypertension and diabetes who undergo TURP need a close monitoring in terms of their blood pressure and blood glucose level since these co-morbidities have shown to associate negatively with immediate outcome of TURP.
- A long follow-up study should be done to assess long-term complications of TURP and the effect of hypertension and diabetes on BPH management.

5.3 Study Limitations

Inadequacy of peri-operative data not documented or reported from operating staff for study results accuracy.

Surgeons experience (TURP is done by different surgeons with different experience). MNH is teaching institution where trainees perform some of the TURP.

5.4 Mitigation of the limitations

Operating Staffs or attending doctors were consulted whenever there was missing data from patients' files.

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APPENDICES

Appendix 1: Data Collection Tool

PATIENT'S DATA SHEET.

1. Patient's file number-----
2. Age of the patient-----
3. Address-----
4. Patient's or close relative's phone number -----
5. Patient's complain
 - a) Difficulty in passing urine
 - b) Obstructive symptoms (hesitance, straining, weak stream, intermittency, terminal-dribbling, sense of incomplete emptying)
 - c) Irritative symptoms (urgency, urge incontinence, frequency, nocturia)
 - d) Hematuria
 - e) Painful micturition
6. Duration of illness prior to TURP.....
7. Patient's voiding on admission.
 - a) Per urethral normally
 - b) Per urethral catheter
 - c) Per SPC
8. Indication for TURP
 - a) Bothersome LUTS
 - b) Episode/episodes of Urinary retention
 - c) Recurrent hematuria due to BOO
 - d) Renal insufficiency due to BOO
 - e) Bladder Calculi due to BOO
 - f) Others, specify.....
9. Prostate size by ultrasound.....

- 10. Prostate size by DRE
 - a) Grade 1
 - b) Grade 2
 - c) Grade 3
- 11. Patient's co-morbidities
 - a) Hypertension
 - b) Stroke
 - c) Diabetes
 - d) Heart diseases
 - e) Others, specify.....
- 12. Intraoperative complications
 - a) TUR syndrome
 - b) Blood Transfusion
 - c) Capsular perforation
 - d) Others, specify.....
 - e) None
- 13. Resection time.....
- 14. Estimated amount of blood loss.....
- 15. Duration of Continuous bladder irrigation (CBI)
- 16. Immediate post-operative outcome
 - a) Voiding normally after initial removal of catheter
 - b) Failure to void after initial removal of catheter
 - c) Clot retention
 - d) Blood transfusion
 - e) Urge incontinence
 - f) Others, specify.....

17. Indication of Blood transfusion if the patient has been transfused.

- a) Low Hb
- b) Severe bleeding/blood loss
- c) Anesthesiology's request
- d) Others, specify.....

18. Number of units transfused

- a) 1 Unit
- b) 2 units
- c) More than 2 units

19. Number of days of hospital stay.....

20. Number of days with indwelling catheter after TURP.....

Appendix 2: Consent Form (English Version)

TITLE: Immediate outcome of Transurethral Resection of the Prostate at Muhimbili National Hospital

Greetings Sir,

I am Dr. Titus Ndimbo, a resident in the Department of general surgery taking master of medicine in Urology. I am conducting a research on immediate outcome of transurethral resection of the prostate at MNH.

Aim of the study

This study aims to assess immediate outcome of transurethral resection of the prostate at MNH.

Participants

All patients undergoing TURP in the department of urology at MNH

Risks:

There are no risks associated with being involved in the study.

Benefits

Patients will benefit from close monitoring and follow up.

The study will provide data about immediate outcome of TURP that can be used to improve health care services for patients with BPH.

Confidentiality

All the information collected from the patient will not be revealed to anybody except attending doctors and the patient himself.

Costs

No payment will be requested from you as a fee to participate in the study

Voluntary participation and rights to withdraw

Your participation is voluntary and you have the right to discontinue from participating in the study at any time. Your decision will not affect in anyway your right to care and treatment.

Person to contact in case of questions or any clarifications regarding this research:

Dr. Titus Ndimbo- 0713785342/0767875343, email: titusndimbo@gmail.com

Principal Investigator or

Prof. Muhsin M Aboud,

Principle Investigator-Dartmouth MUHAS Research Ethics Training (DMRET)

Associate Professor, Department of Surgery

Consultant Urologist

Supervisor of this study,

Muhimbili University of Health and Allied Sciences (MUHAS)

P.O.BOX 65001

Dar-es-salaam, Tanzania

Tel: +255713292617, email: aboudmuhsin@gmail.com, maboud@muhas.ac.tz

In case of any information about your rights as a participant in this study, please contact:

Dr. Joyce R Masalu

Director of Research and Publications,

Muhimbili University of Health and Allied sciences (MUHAS)

P. O. Box 65001, Dar es Salaam.

Tel: +255 22 2152489/0302-6

Email address: drp@muhas.ac.tz

I have read/been told of the contents of this form and understood its meaning. I agree to participate in this study.

Signature (Participant) Date

Signature (Researcher) Date

Appendix 3: Consent Form (Kiswahili Version)

Fomu ya ridhaa katika Utafiti kuhusu matokeo ya muda mfupi baada ya kufanyiwa upasuaji wa tezi dume kwa kupitia njia ya mkojo katika Hospitali ya Taifa Muhimbili

Salaam,

Ndugu, habari za wakati huu!

Utambulisho

Jina langu ni Dkt. Titus Ndimbo, mwanafunzi wa shahada ya uzamili ya udaktari wa magonjwa ya mfumo wa mkojo na uzazi kwa wanaume katika Chuo Kikuu cha Muhimbili. Ninafanya Utafiti kuhusu matokeo ya muda mfupi baada ya kufanyiwa upasuaji wa tezi dume kwa kupitia njia ya mkojo.

Lengo la utafiti

Lengo la Utafiti huu ni kuangalia matokeo ya muda mfupi baada ya kufanyiwa upasuaji wa tezi dume kwa kupitia njia ya mkojo kwa wagonjwa wote wenye shida ya tezi dume kuwa kubwa watakao hudumiwa na idara ya magonjwa ya mfumo wa mkojo na uzazi kwa wanaume katika hospitali ya Taifa Muhimbili

Utafiti huu unamhusu nani?

Utafiti huu una mhusu mtu yoyote, atakaye hiari, anaye kuja hapa katika idara hii na atakaye hudumiwa kwa njia ya upasuaji wa tezi dume kwa kupitia njia ya mkojo. Mshiriki atahojiwa maswali kadhaa kuhusiana na maisha yake na ugonjwa wake.

Faida na athari

Utafiti huu hauna athari yoyote kwa mshiriki. Mshiriki ataelimishwa kuhusu ugonjwa husika. Mshiriki pia atafaidika kwa kuwa katika uangalizi wa karibu zaidi.

Usiri wa taarifa

Taarifa tutakazo chukua zitatunzwa kwa usiri. Taarifa hizo zitatumika tu kwa ajili ya Utafiti huu.

Gharama ya kushiriki katika Utafiti huu.

Mshiriki hataingia gharamayoyote ili kushiriki katika Utafiti huu.

Kushiriki kwa hiari na haki ya kujitoa.

Kushiriki katika Utafiti huu ni kwa hiari na unaweza kujitoawakati wowote. Vyovyote vile uamuzi wako hautaathiri mwenendo wa matibabu yako.

Ukiwa na maswali au shida wakati wowote kuhusiana na Utafiti huu wasiliana

Na wafuatao:

Dkt. Titus Ndimbo -0713785342, 0767875343 Mtafiti Mkuu, au Prof Muhsin M Aboud 0713292617, mkufunzi katika chuo kikuu cha Afya na sayansi shirikishi Muhimbili na Msimamizi wa Utafiti huu.

Iwapo utakuwa na swali lolote kuhusu haki zako kama mshiriki katika Utafiti huu wasiliana a Dr. Joyce R Masalu

Mkurugenzi wa Utafiti na Machapisho

Chuo Kikuu cha afya na Sayansi shirikishi Muhimbili,

S.L.P. 65001, Dar es Salaam.

Simu ya ofisi: +255 22 2152489/0302-6

Email address: drp@muhas.ac.tz

Mimi nimeelezwa/nimesoma yaliyomo katika

Fomu hii nanimeelewa maana yake. Nakubalikushirikikatikautafitihuu.

Sahihi..... (Mshiriki) Tarehe.....

Sahihi (Mtafiti) Tarehe

Appendix 4: Tables of results showing factors affecting immediate outcome of TURP.

Table 5.1.1 Relationship between Age and Voiding status after TURP

Age group	Voiding status after TURP		Total
	Failure of void	Voiding per urethra	
≥70	5 (8.2%)	56 (91.8%)	61 (100%)
< 70	4 (5.2%)	73 (94.8%)	77 (100%)
Total	9 (6.5%)	129 (93.5%)	138(100%)

P Value=0.51, RR=1.58

There is no statistically significant association between age group and voiding status after TURP, though patients with 70years or more were more associated with failure to void. P value is >0.05.

Table 5.1.2 Relationship between prostate size and Voiding status after TURP

Prostate size in grams	Voiding status after TURP		Total
	Failure of Void	Voiding per urethra	
> 75	2 (5.6%)	34 (94.4%)	36 (100%)
≤ 75	7 (6.9%)	95 (93.1%)	102 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P-value=1

RR=0.81

There is no statistically significant association between prostate size and voiding status after TURP, though patients with prostate size of 75 grams or less were more associated with failure to void. P value is >0.05 .

Table 5.1.3 Relationship between indication of TURP and Voiding status after TURP

Indication for TURP	Voiding status after TURP		Total
	Failure of Void	Voiding per urethra	
Complication of BOO	1 (11.1%)	8 (88.9%)	9 (100%)
Severe symptoms	8 (6.2%)	121 (93.8%)	129 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P-value= 0.47 RR=1.79

There is no statistically significant association between indication of TURP and voiding status after TURP, though patients with complication of BOO were more associated with failure to void. P value is >0.05 .

Table 5.1.4 Relationship between Hypertension and voiding status after TURP

Hypertension	Voiding status after TURP		Total
	Failure of Void	Voiding per urethra	
Yes	7 (12.5%)	49 (87.5%)	56 (100%)
No	2 (2.4%)	80 (97.6%)	82 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value= 0.031 RR=5.13

Patients with hypertension were more associated with failure of void post-TURP compared to non hypertensive patients and the difference is statistically significant with P value < 0.05, RR=5.13.

Table 5.1.5 Relationship between Diabetes and Voiding status after TURP

	Voiding status after TURP		Total
	Failure of Void	Voiding per urethra	
Diabetes			
Yes	3 (23.1%)	10 (76.9%)	13(100%)
No	6 (4.8%)	119 (95.2%)	125(100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value= 0.04 RR=4.8

Patients with diabetes were also more associated with failure of void post-TURP compared to non diabetic patients and the difference is statistically significant with P value < 0.05, RR=4.8

Table 5.2.1 Relationship between age group and Incidence of Clot retention post TURP

Age group	Incidence of Clot Retention		Total
	Yes	No	
≥70	15 (24.6%)	46 (75.4%)	61 (100%)
< 70	15 (19.5%)	62 (80.5%)	77 (100%)
Total	30 (21.7%)	108 (78.3%)	138(100%)

P value=0.47 RR=1.26

There is no statistically significant association between age group and incidence of clot retention, though patients with 70years or more were more associated with incidence of clot retention, P value is >0.05 .

Table 5.2.2 Relationship between prostate size and Incidence of Clot retention

Prostate size in grams	Incidence of Clot Retention		Total
	Yes	No	
> 75	9 (25%)	27 (75%)	36 (100%)
≤ 75	21 (20.6%)	81 (79.4%)	102 (100%)
Total	30 (21.7%)	108 (78.3%)	138 (100%)

P value= 0.58 RR=1.21

There is no statistically significant association between prostate size and incidence of clot retention, though patients with more than 70years were more associated with incidence of clot retention, P value is >0.05 .

Table 5.2.3 Relationship between indication of TURP and Incidence of Clot retention

Indication for TURP	Incidence of Clot Retention		Total
	Yes	No	
Complication of BOO	2 (22.2%)	7 (77.8%)	9 (100%)
Severe symptoms	28 (21.7%)	101 (78.3%)	129 (100%)
Total	30 (21.7%)	108 (78.3%)	138 (100%)

P value= 1 RR=1.02

There is no statistically significant association between indication of TURP and incidence of clot retention, though patients with complication of BOO were more associated with incidence of clot retention, P value is >0.05 .

Table 5.2.4 Relationship between Hypertension and Incidence of Clot retention

Hypertension	Incidence of Clot Retention		Total
	Yes	No	
Yes	14 (25%)	42 (75%)	56 (100%)
No	16 (19.5%)	66 (80.5%)	82 (100%)
Total	30 (21.7%)	108 (78.3%)	138 (100%)

P value=0.44 RR=1.28

There is no statistically significant association between hypertension and incidence of clot retention, though patients with hypertension were more associated with incidence of clot retention, P value is >0.05 .

Table 5.2.5 Relationship between Diabetes and Incidence of Clot retention post TURP

Diabetes	Incidence of Clot Retention		Total
	Yes	No	
Yes	6 (46.2%)	7 (53.8%)	13 (100%)
No	24 (19.2%)	101 (80.8%)	125 (100%)
Total	30 (21.7%)	108 (78.3%)	138 (100%)

P value=0.036 RR=2.4

Patients with diabetes were more associated with Clot retention compared to non diabetic patients and the difference is statistically significant with P value < 0.05. RR=2.4

Table 5.3.1 Relationship between age group and Post- TURP blood transfusion

Age group	Post TURP BT		Total
	Yes	No	
≥70	5 (8.2%)	56 (91.8%)	61 (100%)
< 70	4 (5.2%)	73 (94.8%)	77 (100%)
Total	9 (6.5%)	129 (93.5%)	138(100%)

P value= 0.51

RR=1.58

There is no statistically significant association between age group and post TURP blood transfusion, though patients with 70years or more were more associated with post TURP blood transfusion, P value is >0.05.

Table 5.3.2 Relationship between prostate size and Post- TURP blood transfusion

Prostate size in grams	Post TURP BT		Total
	Yes	No	
> 75	5 (13.9%)	31 (86.1%)	36 (100%)
≤ 75	4 (3.9%)	98 (96.1%)	102 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value=0.052

RR=3.54

There is no statistically significant association between prostate size and post TURP blood transfusion, though patients with prostate size of more than 75grams were more associated with post TURP blood transfusion, P value is >0.05 .

Table 5.3.3 Relationship between indication of TURP and Post- TURP blood transfusion

Indication for TURP	Post TURP BT		Total
	Yes	No	
Complication of BOO	2 (22.2%)	7 (77.8%)	9 (100%)
Severe symptoms	7 (5.4%)	122 (94.6%)	129 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value=0.11 RR=4.1

There is no statistically significant association between indication of TURP and post TURP blood transfusion, though patients with complication of BOO were more associated with post TURP blood transfusion, P value is >0.05 .

Table 5.3.4 Relationship between Hypertension and Post- TURP blood transfusion

Hypertension	Post TURP BT		Total
	Yes	No	
Yes	6 (10.7%)	50 (89.3%)	56 (100%)
No	3 (3.7%)	79 (96.3%)	82 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value= 0.158 RR=2.93

There is no statistically significant association between hypertension and post TURP blood transfusion, though patients with hypertension were more associated with post TURP blood transfusion, P value is >0.05 .

Table 5.3.5 Relationship between Diabetes and Post- TURP blood transfusion

	Post TURP BT		Total
	Yes	No	
Diabetes			
Yes	4 (30.8%)	9 (69.2)	13 (100%)
No	5 (4%)	120 (96%)	125 (100%)
Total	9 (6.5%)	129 (93.5%)	138 (100%)

P value=0.005

RR=7.69

Patients with diabetes were more associated with Post-TURP blood transfusion compared to non diabetic patients and the difference is statistically significant with P value < 0.01 , RR=7.69.