

**A COMPARATIVE STUDY OF POST TURP OUTCOME AND
COMPLICATIONS BETWEEN BPH PATIENTS
PRESENTING WITH OR WITHOUT ACUTE URINARY
RETENTION**

Dissertation submitted in partial fulfillment of the requirements of

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AUGUST 2015

CERTIFICATE

This is to certify that this dissertation entitled “**A COMPARATIVE STUDY OF POST TURP OUTCOME AND COMPLICATIONS BETWEEN BPH PATIENTS PRESENTING WITH OR WITHOUT ACUTE URINARY RETENTION**” submitted by **Dr. K. SENTHILNATHAN** appearing for **M.Ch (Urology)** degree examination in August 2015 is a original bonafide record of work done by him during the academic period of August 2012 to July 2015 under direct supervision and guidance in partial fulfillment of requirement of the Tamil Nadu Dr.M.G.R. Medical University, Chennai, Tamilnadu, India.

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TABLE OF CONTENTS

SL. NO	TITLE	PAGE NO.
1	INTRODUCTION	1
2	AIM OF THE STUDY	5
3	REVIEW OF LITERATURE	6
4	MATERIAL AND METHODS	31
5	OBSERVATION AND RESULTS	40
6	DISCUSSION	76
7	CONCLUSION	83
8	BIBLIOGRAPHY	84
9	ANNEXURE	91

ABBREVIATIONS

AUA	American Urological Association
BPE	Benign Prostatic Enlargement
BPH	Benign Prostatic Hyperplasia
AUR	Acute urinary retention
BOOI	Bladder outlet obstruction Index
DRE	Digital Rectal Examination
LUTS	Lower Urinary Tract symptoms
TRUS	Transrectal Ultrasonography
TAUS	Transabdominal Ultrasonography
TPV	Total prostate volume
TZV	Transitional zone volume
TZI	Transitional zone index
IPP / IPPV	Intravesical prostatic protrusion
DWT	Detrusor wall thickness

PVR	Postvoid residual
PSA	Prostate specific antigen
Qmax	Maximum flow rate
Pdet	Detrusor pressure
QoL	Quality Of Life
DHT	Dihydrotestosterone
IVF	Intravenous fluids
TUIP	Trans urethral incision of prostate
IPSS	International prostate symptom score

INTRODUCTION

INTRODUCTION

Benign prostatic hyperplasia (BPH) is a very common urological condition affecting men in older age group. It occurs in about 10 % of men of the age of less than 40 years, and increased to 80 % in age group of 80. Even though there are other causes now being considered, Benign prostatic hyperplasia still remains one of the most common cause in men that can give rise to lower urinary tract symptoms, with or without bladder outlet obstruction (BOO). It has been documented in a multicenter study that the age-related division of men with symptoms was higher in the Asia Pacific when compared to the Western countries. The reason behind this is unknown.

The pathological process in BPH is a hyperplasia (and not hypertrophy) which affects both the stromal and glandular elements of this gland. This condition affects the quality of life (QOL) in a significant way in many of the patients.

Even though most seek medical intervention because of bothersome symptoms, BOO was found in 60% in those symptomatic and 52% in those asymptomatic^{1, 2}. Lower urinary tract symptoms affect the patient's quality of life. Intervention may be needed for bothersome symptoms in around 30% of men who are older than 65 years³.

Several theories have been proposed in the etiopathogenesis of BPH.

These include

- Age-related tissue changes,
- Metabolic syndrome
- Hormonal alterations,
- Inflammation⁴.

Although BPH is not caused by the androgens, the postulated theory is that the presence of androgens is needed for the pathogenesis. It should be borne in mind that the association between metabolic syndrome and the development of BPH exist. Recent evidences suggest that BPH may be due to an inflammatory-based disorder.

For male older than 50 years of age, TURP is the second most common surgery performed next only to cataract surgery. Even though many new modalities of management for the BPH have been developed, TURP is still the gold standard as for as the management of BPH is concerned⁵. The development of LASERs in endourology is gradually replacing the TURP in the management of BPH. Holmium laser (HoLEP) is said to be the gold standard ^{6, 7} though many urologists have reservation in accepting this as the gold standard. The major disadvantage is the prohibitive cost of these lasers.

TURP still remains the widely used technique for the management of BPH^{8,}

9, 10

TURP has become a relatively safer procedure due to the advent of newer technologies in diathermy and visual scopes. But still there is a chance of TURP syndrome and electrolyte imbalance especially in high-risk cardiac patients. The risk is accentuated by the use of glycine for irrigation. The complications rates were decreased with the development of bipolar diathermy with normal saline as irrigant fluid.

Acute urinary retention

Acute retention of urine is a severe symptom of men who developed BPH. It is defined as a sudden and painful inability to void voluntarily^{11, 12}. Even though there are many causes of AUR, the most common cause being BPH. The prevalence rate of AUR in men with BPH is estimated to be as high as 53%¹³ AUR is a painful condition. Higher mortality and morbidity rates in men presenting with AUR have been reported in previous studies^{14, 15}.

In Western countries, AUR was the chief complaint in 20 – 42% of men who underwent TURP¹⁶. Escalating postoperative complications and longer Hospital stays in men with BPH who develop AUR have been reported^{15, 16, and 17}. Patients who presented with AUR had a high mortality rate in the first 3 years after prostatectomy¹⁸. There are many studies available describing the

complications of BPH. Comprehensive comparative analysis of post-TURP complications between patients with and without AUR is lacking.

In our study we tried to compare the post TURP complications between patients who presented with and without AUR

AIM OF STUDY

AIM OF STUDY

To compare the outcome and complications of TURP for BPH patients with and without acute urinary retention

**REVIEW OF
LITERATURE**

REVIEW OF LITERATURE

During the third month of fetal life the prostate begins to develop from the urogenital sinus. The development process is influenced primarily by the DHT. There are five epithelial buds on the posterior surface of the urogenital sinus which forms the prostate. This is present on either side of the verumontanum, which then invades the mesenchyme. The top buds are mesodermal in origin and it forms the inner zone and the lower buds are endodermal in origin which forms the outer zone. This is very important as benign prostatic hyperplasia (BPH) develops from the inner zone whereas the carcinoma arises from the outer zone. Around the urethra the inner and the outer zone develops as a concentric circle. On the outside of this zone the long branched ducts form the thick outer layer of the true prostate gland. The mucosal, sub mucosal gland, the ejaculatory ducts and the small remnants of the mullerian duct—the utriculusprostaticus, which forms the small prostatic utricle are present in the central region. By fourth month of fetal development the prostate is well differentiated .The acini and collecting ducts are formed in the prostate. During development the growth occurs primarily on the tips, as the ducts extend and branch. This concept that dynamic growth processes occur along a budding and branching system was developed from studies on the mouse and rat prostate ¹⁹ (Sugimura et al, 1986 ; Banerjee et al, 1993a, 1993b; Cunha, 1994).

The weight of a normal prostate gland is 18 grams. It has an anterior, posterior and lateral surface. The prostatic urethra traverses through the gland. The prostate has a narrow apex which is directed inferiorly and a broad base which is directed superiorly.^{24, 27} The gland is surrounded by a capsule which is composed of collagen, elastin, and smooth muscle. The average thickness of the capsule in the posterolateral aspect is 0.5mm. The plane between Denonvilliers' fascia and the rectum is defined by the loose areolar tissues. The capsule on the anterior and anterolateral surface blends with the endopelvic fascia. The apex of the gland is fixed to the pubic bone by puboprostatic ligament.

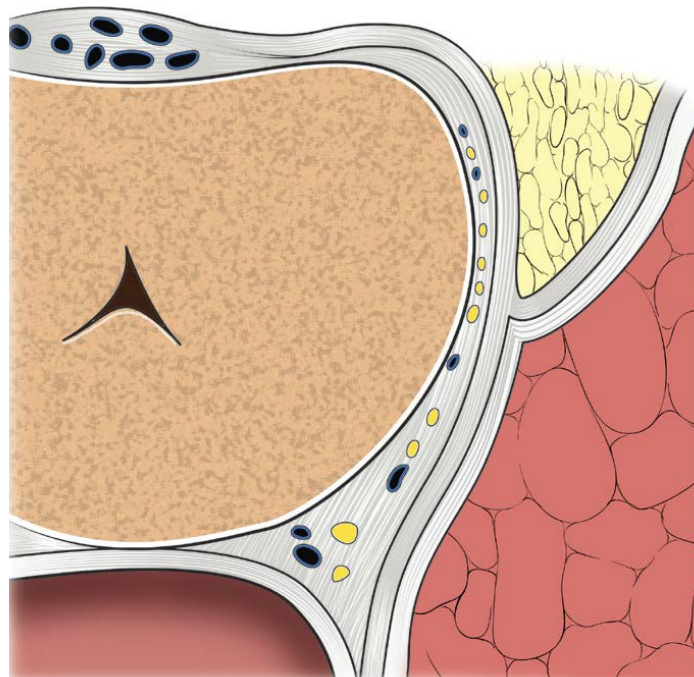


Figure 1 Anatomy of Prostate gland

The pubococcygeal portion of levatorani muscle covers it and is related to its endopelvic fascia in the lateral aspect. Below is the Myers lateral endoprostic fascia.^{21, 22}. The neurovascular bundle runs posterolaterally towards the prostate in the lateral prostatic fascia.

The apex of the prostate is continuous with the rhabdosphincter^{28, 29}. Histology reveals that the normal prostatic glands extend into the rhabdosphincter and there is no intervening capsule between the prostatic apex and the rhabdosphincter.

Structure of the prostate

Prostate is composed of 70% glandular elements and 30% fibro muscular stroma. The fibro muscular stroma encircles the glandular elements of the prostate When it contracts during ejaculation it will express prostatic secretions into the urethra.

ZONAL ANATOMY²³

1. The five lobes of the prostate can be seen before twenty weeks of intrauterine life.
2. Out of the five lobes, 3 lobes are recognizable- 2 lateral and a median lobes
3. From a pathological point of view, the glandular tissue is subdivided into 3 distinct zones.

- 1) Peripheral (70% by volume)-PZ
- 2) Central (25% by volume)-CZ
- 3) Transition (5% by volume)-TZ
4. Fibro muscular stroma of the prostate occupies the space between the peripheral zones that are anterior to the preprostatic urethra.
5. The CZ is posterior to the preprostatic urethra and is conical in shape. It is traversed by the ejaculatory duct.
6. Mucus secreting glands are present in the tissue which surrounds the preprostatic urethra
7. The pathological process rarely affects the CZ as its histological properties are different from the rest of the prostate. The CZ is thought to be a derivative of the Wolffian duct system (Like that of the epididymis, vasa differentia and seminal vesicles)

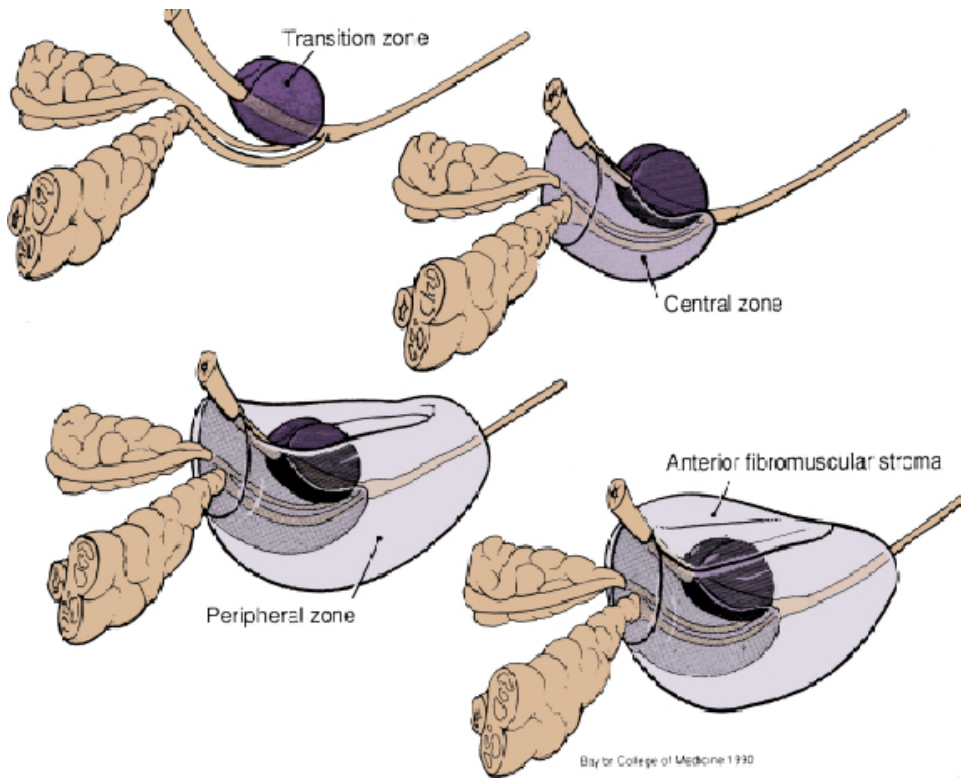


Figure 2 Zonal Anatomy of Prostate

On clinical examination the prostate is described as having two lateral lobes and a median lobe. The central sulcus which separates the two lateral lobes will be palpable on per rectal examination.

ETIOPATHOGENESIS OF BPH

Many theories have been postulated in the pathogenesis of BPH.

- The androgen acts via the receptors and induces the development of prostate.
- In adults the quiescence state of the prostate is maintained by the homeostatic mechanisms between stroma and epithelium.

- Even though DHT is the primary growth hormone for prostate, its level is not elevated with human BPH³⁰. The paradoxical observation of development of BPH despite declining levels of androgen denotes that secretion of other factors may be the reason behind this³¹.
- Estrogens along with other hormones may cause benign prostatic hyperplasia. Sometimes it may leads to the development of neoplasia, and dysplasia^{32, 33, 34}.

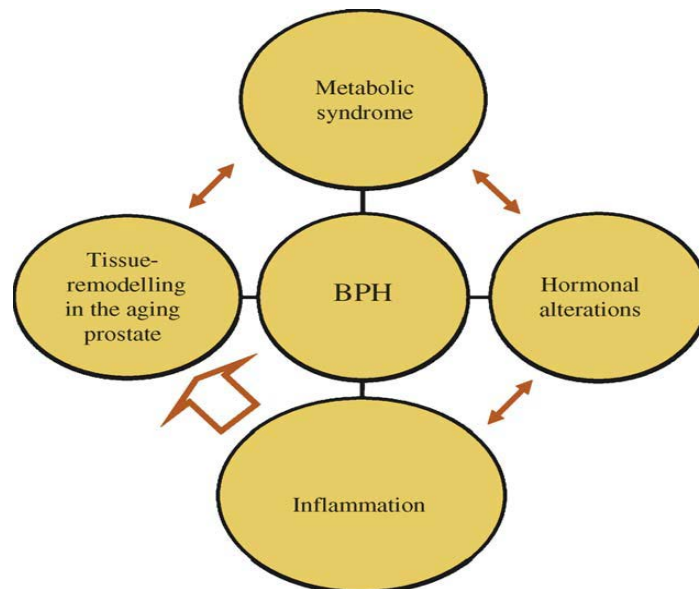


Figure 3 Pathogenesis of BPH

Cunha et al^{19, 32} described that the stroma is responsible for the modulation of the differentiation pattern of prostatic epithelium. Abnormal peptide factors are also implicated in this process. The “stromal cell” is the key

cell as many growth factors are secreted by these stroma cells. These growth factors act on the cells and leads to the development of BPH

There are many qualitative as well as quantitative changes that occur in the extracellular matrix. The exact role played by the glycosaminoglycans and epidermal growth factor is under study³⁵

Infection has its own role to play in the pathogenesis of BPH³⁶. Many literatures which describe the pathogenesis of BPH have suggested that inflammation does have a definitive role to play^{37, 38, 39, 40, and 41}. Kramer and Marberger⁴¹ have described the recent concepts of the role of inflammation. Growth of the fibro muscular stroma is supported by the production of cytokines (IL-2 and IFN γ)⁴¹. Surrounding cells die, and the empty spaces will be occupied by nodules.

Familial association for BPH has been described by Sands et al (1994) and Robert et al (1997)

Pathophysiology of BOO

Many terms are in use to describe and quantify the bladder and lower urinary tract symptoms due to prostate enlargement. No single symptom is singularly representative of BPH. Stricture urethra, function of the detrusor muscle and the CNS function all will interact to produce lower urinary tract symptoms. These symptoms were historically described as 'prostatism'.

The following are the mechanisms by which Benign prostatic hyperplasia (BPH) may cause obstruction:-

- Ball wall mechanism caused by the large median lobe enlargement
- A dynamic obstruction due to the contractile effect of the prostatic smooth muscle
- A static obstruction due to the enlarged prostate which envelopes the prostatic urethra, or a restricted surgical capsule.

Each one of the above said mechanisms is clinically feasible and components of each are likely to be present in most of the cases. As a result of which there will be an increased intravesical pressure and a reduction in flow, which ends up in gradual development of secondary changes in the muscle.

Histological Features

Benign prostatic hypertrophy is a misnomer because there is only hyperplasia and not a hypertrophy. This fact has been illustrated by McNeal in his histological study. McNeal's studies demonstrated that most of early periurethral nodules were purely stromal in character²⁵.

BPH in its early stage of its development is characterized by an increase in the number of nodules. The growth of each new nodule is generally very slow^{24, 25} (McNeal, 1990). During the secondary phase there is a growth of cells in large nodules.

There is pleomorphism in the stromal-epithelial tissues ratio. Fibro muscular stroma predominates in the smaller glands⁴² (Shapiro et al, 1992b) whereas epithelial nodules predominates in the larger glands⁴³ (Franks, 1976).

Importance of Prostatic Smooth Muscle

Major portion of the enlarged gland is composed of prostatic smooth muscle⁴² (Shapiro et al, 1992a). There are both active and passive forces which present in and around prostatic tissue play a major role in the pathophysiology of BPH⁴³ (Shapiro et al, 1992), All these will leads to a mechanical and dynamic outlet obstruction. α -Adrenergic blockade results in significant down regulation of smooth muscle myosin heavy chain which will leads to a decrease in dynamic obstruction⁴⁴ (Lin et al, 2001).

Effect of obstruction on the bladder:

Alteration in the gross anatomical, histological, cellular and molecular aspects in the bladder wall, because of outlet obstruction impairs its function and adds to the symptomatology of BPH⁴⁵. Early phases of outflow obstruction are compensated by the detrusor muscle Hypertrophy. When the obstruction is chronic there will be decreased compliance of the detrusor and impaired emptying. This occurs due to the deposition of extracellular matrix (ECM)⁴⁶. During this process acute urinary retention may occur and may be either due to the bladder failure, as well as due to a sudden increase in outflow obstruction. The alteration in ECM is probably the most common pathophysiological feature

in chronic obstruction. Experimental Studies from the rabbit model have shown that significant smooth muscle hyperplasia is induced whenever the load is increased and that this is will be associated with down regulation of myosin light chain (MLC) expression. This effect contributes to the decreased smooth muscle contractility ⁴⁷.

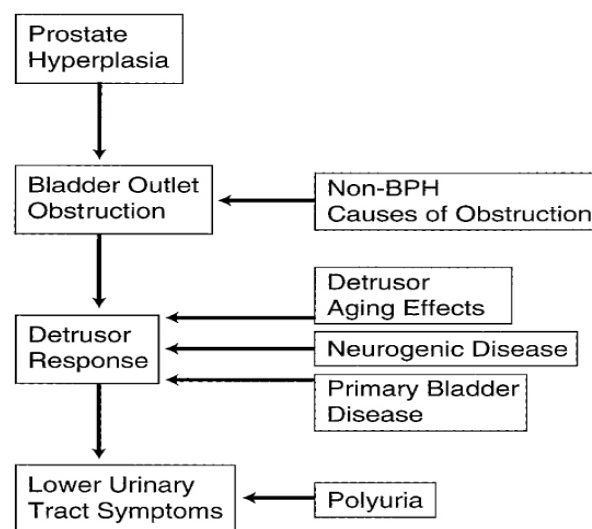


Figure 4: The Pathophysiology of BOO

Lower Urinary Tract Function of Ageing

Due to the process of ageing there will be CNS effects and changes in adjacent organ systems which may increase LUTS ⁴⁸.

The degree of the prostatic enlargement does not always correlate with the LUTS.

There are some drugs which induce LUTS in some individuals with a normal lower urinary tract ⁴⁹. Severe bothersome symptoms, dysfunction of the urinary bladder, urinary tract infection, CKD etc are the clinical end points. Olmstead

County Study gave us insights regarding the natural progression of benign prostatic enlargement⁴⁹.

Lower Urinary Tract Symptoms

The nomenclature used to describe voiding dysfunction in aging men is quiet confusing and often inaccurate⁵⁰. The term BPH should be used with reference to the histological process of hyperplasia. In patients with benign prostatic enlargement (BPE) there will be an increase in total prostate volume because of BPH. Enlargement of prostate may or may not produce clinically significant LUTS and the BPE may or may not produce features of bladder outlet obstruction.

Lower urinary tract symptoms (LUTS) is the current most commonly accepted terminology for urinary symptoms⁵⁰. According to the International Continence Society (ICS), LUTS means:

- A symptom, - Which is perceived by the subject⁵¹
- A sign – which is observed by the physician⁵¹
- A condition – which is defined by urodynamic evaluations⁵¹

Abrams et al classifications of LUTS:-

He classified the symptoms into three categories which were incorporated in the ICS system:

- Storage symptoms - Symptoms which occurs during the filling phase

- Voiding symptoms - Problems during voiding.
- Post micturition symptoms – Symptoms which occurs immediately after micturition.

Prediction of Bladder Outlet Obstruction:

Tools which are used to evaluate the degree of BOO due to BPH

- Symptom Scores / QoL
- Prostate volume
- Qmax
- Bladder outlet obstruction index / Bladder contractility Index
- Post void Residual urine
- PSA

All the above said parameters neither by themselves nor in combinations were very predictive of the need for surgery in BPH patients.

USG parameters to assess the BOO

- Total prostate volume
- Transitional zone volume
- Transitional zone index
- Intravesical prostatic protrusion
- Resistive index
- Detrusor wall thickness
- Ultrasonic estimation of bladder weight.

Management of BPH

Even though many alternative techniques have been introduced for the management of BPH, TURP is still the generally accepted procedure of choice for BPH. Advancement in the technology has reduced the complication rates for the past few years.

Indications for TURP

- Recurrent UTI caused by BOO
- Recurrent episodes of urinary retention
- Bladder calculi
- Recurrent haematuria
- Renal insufficiency caused by BPH

Various techniques have been described for the resection of prostate. Monopolar and bipolar current can be used. The irrigation fluid for the bipolar is normal saline. Complications rates have been said to be decreased with resection in saline using bipolar.

Laser prostatectomy

Other alternative technologies used for the ablation of prostate is using of laser for resection. The main advantages of this technique are it provides a virtually bloodless field and also the post surgical catheterization time is short with functional outcomes that are comparable with TURP.

Intra-operative complications

Technical difficulties are the main reasons for these intraoperative complications

Bleeding

Arterial bleeding will be more for patients with preoperative infection or urinary retention, because the gland will be congested. Treatment with anti-androgen like finasteride or flutamide may reduce bleeding. Whenever there is capsular perforation or opening of the venous sinusoids, there will be profuse venous bleeding. The gland size and resection weight may dictate the amount of bleeding

Management of bleeding

Coagulation of bleeders is very important in TURP surgery. Irrigation fluid returning should be glistening pink in colour. Bleeding from arteries will be bright red in colour; in that case we should reintroduce the resectoscope and coagulate the bleeding points completely. Bleeding from the small veins can be controlled with Foleys balloon with traction.

TUR syndrome can occur especially if we are doing resection using monopolar with water or glycine as irrigant. It should be promptly diagnosed and treated appropriately.

Extravasations

Extravasations can occur if there is capsular breach with elevation of trigone of the bladder. For extra peritoneal extravasations, mere placement of catheter drainage is sufficient. Intraperitoneal extravasations should be drained or sometimes surgery may be needed.

Injury of orifices

During resection of large mid-lobes there is always a chance of injuring the ureteric orifice. The management of ureteric orifice injury depends on the extent and nature of injury.

Complications of TURP

	Authors	Numbers	Transfusion Rate (%)	Revision Rate (%)	Infection Rate (%)	TUR syndrome (%)
Early Periods	Zwergel et al 1979	232	21.2	NA	NA	1.6
	Mebust 1989	3885	6.4	NA	2.3	2
	Doll 1992	388	22	3	14	NA

	Authors	Numbers	Transfusion (%)	Revision (%)	Infection (%)	TUR syndrome (%)
Inter mediate periods	Zwergel 1995	214	14.6	NA	NA	0.8
	Horninger 1996	1211	7.6	NA	NA	2.8
	Haupt 1997	934	2.2	NA	NA	0.3
	Gallucci 1998	80	0	NA	5	0
	Gilling 1999	59	6.6	3.3	8.2	0

	Authors	Numbers	Transfusion (%)	Revision (%)	Infection (%)	TUR syndrome (%)
Recent Periods	Heilbronn 2003	126	4.8	4.2	1.7	0.8
	Banden 2003	7707	3	5	3.5	0.8
	Kuntz 2004	100	2	3	4	0
	Berger 2004	271	2.6	NA	NA	1.1

NA = not available.

Perioperative complications

Studies done in early periods

Complications Rate In %	Mebust et al	Doll et al
Clot retention Rate	3.3	11
Bleeding and transfusion rate	6.4	22
TUR syndrome	2	NA
Capsular perforation Rate	0.9	10
HN	0.3	NA
Infection	3.9	25
Sepsis	0.2	3
Retention	6.5	3
Incontinence	NA	38

Studies done in intermediate periods

Complications In %	Haupt et al	Borboroglu et al
Clot retention rate	1.9	1.3
Bleeding and transfusion rate	2.2	0.4
TUR syndrome	0.3	0.8
Capsular perforation rate	NA	NA
HN	0	0
Infection	1.6	4
Sepsis	0.2	0
Retention	NA	7.1
Incontinence	0.3	NA

Study done in recent periods

Complications In %	Kuntz et al
Clot retention Rate	5
Bleeding and transfusion rate	2
TUR syndrome	0
Capsular perforation	4
HN	0
Infection	4
Sepsis	0
Retention	5
Incontinence	1

Bladder tamponade

Clot formations can occur due to recurrent or persistent bleeding which may lead to bladder tamponade that require evacuation or even re intervention (1.3–5%).

Intermittent change of colour in the irrigation outflow indicates that the bleeding is arterial in origin. Whereas dark red continuous flow in irrigant fluid return indicates venous origin

Management

Acute retention of urine due to clots should be evacuated emergently. Then a 3 way foley balloon inflated 20 cc more than the weight of the resected tissue and traction is given. If the return is not clear, the patient should be immediately posted for reintervention with clot evacuation and coagulation of the bleeding points. In these patients bleeding may be stopped by recto-digital compression. If the above mentioned maneuvers does not work then Trans femoral super selective embolization can be done ⁵²

Incontinence

In around 30-40% of cases there may some early incontinence after the TURP, which will get resolved in due course. Only in less than 0.5% of patients there will be persistence of urinary incontinence.

Early management

Patients should be carefully evaluated if there is incontinence.

This may be due to either one of the following reasons

- 1) Irritative symptoms such as due to fossa healing
- 2) Associated UTI
- 3) Detrusor instability caused by long-lasting BPH

Patients can be treated with for symptomatic relief with anticholinergic medications.

Urodynamic evaluation

If the incontinence persists for more than six months thorough investigation has to be done. The patient should be subjected to AUG, diagnostic cystoscopy, and UDE.

Causes of incontinence^{53, 54}

- Sphincter incompetence (30%),
- Detrusor instability (20%),
- Mixed incontinence (30%),
- Residual adenoma (5%),
- Bladder neck contracture (5%), and
- Urethral stricture (5%).

Late management

Exercise to the pelvic floor muscle. Medical management with duloxetine can be tried. Artificial sphincter is the last option if other methods fail.

Urethral stricture

Urethral stricture can occur if larger instruments are used and if there is history of prolonged catheterization. Strictures at the bulbar region occur due to the leakage of monopolar current because of insufficient isolation by the lubricant. We have to apply gel in the urethra as well as in the shaft of resectoscope. We should avoid high cutting current. If there is stricture at the meatus or urethra it should be dealt with internal urethrotomy before TURP

Bladder neck stenosis

Bladder neck stenosis occurs at the rate of 0.3% to 9.2%. This will occur usually when resection is done for smaller glands (<30 g). TURP should be avoided for smaller glands

Retrograde ejaculation

Retrograde ejaculation occurs in most of the patients (53–75%) who underwent TURP. So while treating a younger patient with BPH, it is better to try with medical management, or a TUIP.

Jeng-Sheng Chen et al conducted a retrospective national, population based study in Taiwan to compare the Post TURP outcome for patients who presented with and without AUR. They included men over 50 years of age with the diagnosis of BPH and allocated them into two groups, those with and without AUR. They excluded patients with Parkinsonism disease, prostate cancer, and patients with features suggestive of neurogenic disease. They compared the complications occurred between these two groups after the TURP. They assessed the intra operative and post operative complications and outcomes like, haematuria, need of blood transfusion, UTI as evidenced by the urine culture, septicemia, antibiotic use, mean length of hospitalization, need for recatheterisation, post operative stricture and the need for resurgery and the medical expenses.

Comparison of Post TURP complications between patients with and without retention

Sr no	Variables	With AUR %	Without AUR %	P value
1	Recatheterisation	13.8	0	<0.001
2	Haematuria	8.1	7.4	0.46
3	UTI	18.9	15.6	0.01
4	Stricture	2.6	3.2	0.32
5	Resurgery	1	1.3	0.38
6	LUTS	22.8	16.9	<0.001
7	Sepsis	1.1	0	<0.001
8	Blood transfusion	3.2	1.5	0.004
9	Antibiotics	0.9	0.7	0.49
10	Length of stay	6.4	4.6	<0.001

In their study the recatheterisation rate were 13.8% in AUR group where as it was nil in patients without AUR which is significant with a P value of <0.001. Haematuria occurs in 8.1% in patients with AUR and 7.4% in patients without AUR. This is not statistically significant. UTI occurred post operatively in 18.9% for patients with AUR, where as it was 15.6% in patients without AUR with a P value of 0.01 which was significant. Lower urinary tract

stricture was 2.6% vs 3.2% for patients with and without AUR respectively, which is not statistically significant with a p value of 0.32. Regarding resurgery, it was 1% in AUR group and 1.3% in AUR minus group. LUTS such as increased frequency, dysuria and incontinence were 22.8% in AUR group whereas it was 16.9% in AUR minus group with a p value of <0.01 which was significant. Sepsis occurred in 1.1% in AUR group whereas it was nil in AUR minus group with a p value of <0.001. Need for blood transfusion was 3.2% in AUR group and 1.5% in AUR minus group with a p value of 0.004 which was significant. Mean length of hospital stay and mean medical expenses was statistically significant in AUR group when compared to AUR minus group. They concluded that patients who present with AUR developed more complications than patients without AUR.

In their study, recatheterisation rate was nil in patients without AUR, which showed that detrusor contraction function was injured after urinary retention.

Jeng-Sheng chen et al study from Taiwan showed that recatheterisation rate, Haematuria, UTI, LUTS, sepsis, blood transfusion, second line antibiotic use, mean hospital stay and mean medical expenses were increased for patients with AUR when compared to patients without AUR. Of these variables recatheterisation, UTI, LUTS, sepsis, shock, blood transfusion, mean length hospitalization and medical expenditure were statistically significant for patients who presented with AUR.

Pickard et al study (6) showed, the urinary infection occurs in around 18.6% of the patients who underwent TURP. . In Doll et al study it was quiet higher – 25%. The higher recatheterisation rate may also be the reason for increased UTI in patients with AUR.

Urethral stricture rate reported in literature ranges between 2.2 to 9.8%. It was theoretically explained that the reason for increased rate of stricture in AUR group may be due to increased catheterization and increased number UTIs. Surgical technique, the size of the instrument used for TURP and the lubricant usage should also be taken into account for stricture formation.

Literature reported the resurgery rate after TURP between 3 – 14.5%. The reasons quoted for the re-surgery were blood clot tamponade, torrent bleeding, and inadequate resection

Incontinence

Haupt et al reported incontinence rate as 0.3%. Kuntz showed 1%. It was higher in Doll et al who reported 38%. Even though the IPSS was higher in the immediate post operative period it will decrease over a period of time.

Regarding the lengthy hospital stay and increased medical expenses, the reason may be the associated comorbid factors for patients with AUR

Sajjad Ahmed et al from Lady Reading hospital Peshawar conducted a study to compare the complications between patients with and without AUR who underwent TURP. In their study 48% presented with AUR and 52% presented without AUR. In their study they concluded that the complications rate were higher in patients who presented with AUR.

**MATERIALS AND
METHODS**

MATERIALS AND METHODS

1. Study group:

Patients who were admitted in Kilpauk Medical College and Govt. Royapettah Hospital with lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH) with and without acute urinary retention are included in the study.

2. Study design: Prospective observational analytic study

3. Study period: One year from 01.01.2014 to 31.12.2014

4. Materials:

The patients with complaints suggestive of LUTS were thoroughly evaluated with History & Physical examination, DRE, USG KUB, Uroflow& PVR and patients with BPH were selected. Patients who presented with and without AUR were assigned as group A and Group B respectively

Inclusion criteria –

- 1) Prostate sizes > 30gms and less than 60 gms
- 2) Maximum flow rate (Q_{max}) less than 10 ml/s,
- 3) Men more than 45years and less than 70 years
- 4) Post void residual urine (PVR) exceeding 100 ml,
- 5) Patients who gave informed consent for the study were included

Exclusion criteria –

1. Urethral stricture,
2. Neurogenic bladder, and
3. Previous prostate or urethral surgery
4. Unwilling patients
5. Prostate cancer

This is a prospective analytical study conducted in both Kilpauk Medical College Hospital and Government Royapettah hospital from January 2014 to December 2014.

The ethical committee of this institution has given approval to conduct this study. All men who participated in this study have given written consent for this study. Totally 126 patients were enrolled in this study, of which 74 were patients presented with AUR and 52 were patients who presented without AUR. The diagnosis of BPH was confirmed both by clinical evaluation and by radiological method. Patient age, associated comorbid conditions, was recorded. IPSS grading system was used to assess the patient symptoms. It consists of 7 symptoms with score of 0 to 5 for each symptoms and the total maximum score is 35. Low grade is - 0 to 7. Moderate grade- 8 to 19 and high grade 20 to 35. Based on this patients with moderate to high grade may need interventions. For patients who presented with AUR, urinary symptoms prior to AUR were recorded.

DRE: - Digital rectal examination was done to assess the grade as well as the consistency, symmetry of the gland, any obliteration of median furrow and lateral sulci, and also presence of any nodules were assessed. It was done under local anesthesia with the patient in left lateral position. BPH was graded, depending on the encroachment of the prostate into the rectal lumen.

DRE grading of prostate

Size	DRE
Normal	Encroaches 0 to 1 cm into rectal lumen
I	1 to 2cm
II	2 to 3 cm
III	3 to 4 cm
IV	>4 cm

Basic blood investigations like complete haemogram, renal function test, random blood sugar, serum electrolytes were done before the procedure. Serum electrolytes were done in all the patients after the procedure and during surgery if the clinical picture suggestive of TUR syndrome. Only one patient in the AUR group developed TUR syndrome which was diagnosed and corrected promptly.

Routine urine analysis and urine culture were done in all the patients. Urine culture was done by collecting the mid stream voided urine in patients without AUR. For patients with AUR urine sample was collected from urethral

catheter. If culture was found to be positive appropriate antibiotic was given and UTI treated before the procedure. Urine culture was also done in all the patients after the procedure.

Serum PSA was measured in all the patients who have enrolled in this study. If the patients presented with catheter, serum PSA was done one week later. If the PSA was in the gray zone, or if the percentage of free PSA was low, TRUS followed by biopsy was done to rule out malignancy. If the patient was found to be positive for malignancy he was excluded from the study.

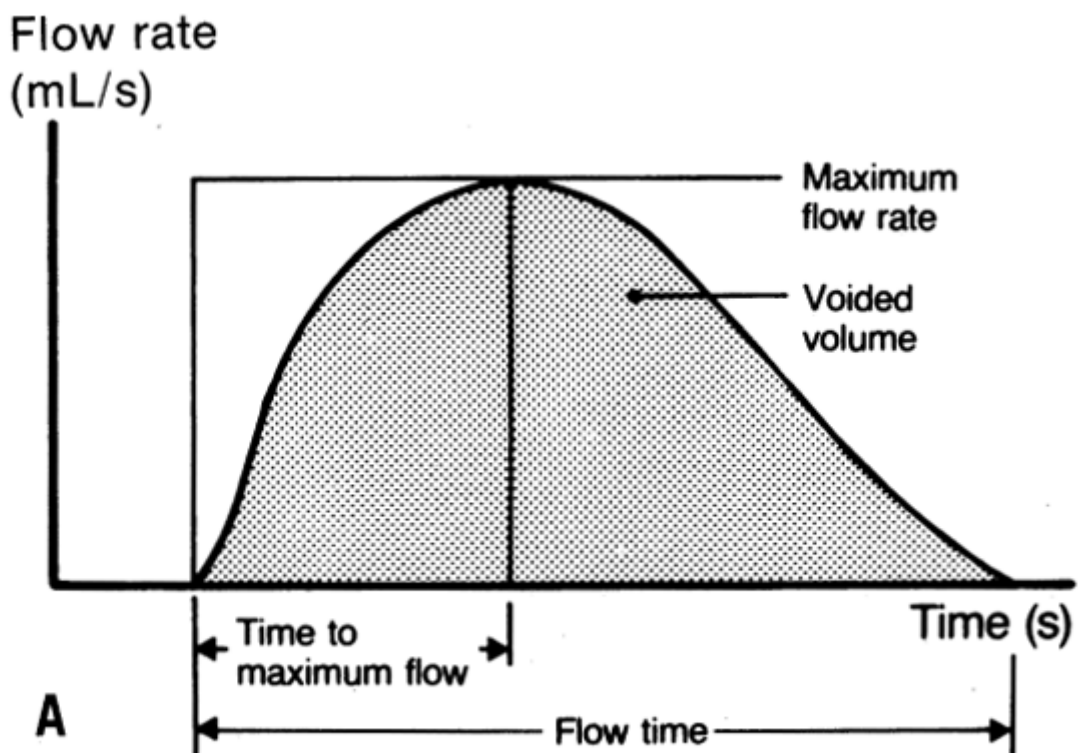
Uroflowmetry was done in all the patients as an outpatient procedure to assess the flow pattern. If stricture pattern was found during the Uroflow evaluation, ascending urothrogram was done to rule out stricture. If the Uroflow findings does not correlates with the clinical examination , or if there is any suspicion of neurogenic bladder, urodynamic evaluation was done to rule out any neurogenic component. Patients with neurogenic problems were excluded from the study.

AHCPR guidelines of Uroflowmetry

- If voided volume is < 125 to 150 ml, the measurements are inaccurate.
- This is the single best non-invasive urodynamic test to detect the BOO, but there is no cut off value
- Q max identifies patients with BPH than Qave

- Patients with $Q_{max} > 15 \text{ ml/sec}$ appear to have poorer outcome than patients with $Q_{max} < 15 \text{ ml/sec}$ after surgery
- $Q_{max} < 15 \text{ ml/sec}$ will not differentiate between patients with obstruction and bladder decompensation.

Uroflow assessment was done in all patients after surgery to compare and analyze the outcome



Normal Uroflowmetry showing bell shaped curve

USG KUB

We did USG for all the patients mostly transabdominal to measure the prostate size and to assess the PVR. USG were done in all the patients postoperatively also to measure the PVR.

METHODS OF ESTIMATING THE PROSTATE SIZE

Size can be estimated either by transabdominal, transrectal, or transperineal USG. As the specific gravity of the gland and that of water are the same, volume is roughly equivalent to weight of prostate i.e. 1 cm^3 equals approximately 1 gram of prostate tissue.

The following dimension are required to calculate the prostate volume

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

Most formulas were devised assuming that the gland conforms to an ideal geometric shape, i.e.

- Ellipse= $\pi /6 \times \text{TS} \times \text{AP} \times \text{CC}$,
- Sphere= $\pi /6 \times \text{TS}^3$,
- Prolate (egg shape) / spheroid = $\pi /6 \times \text{TS}^2 \times \text{AP}$.

The prolate ellipsoid method calculates the volume by using the following formula:

Transverse diameter x Anteroposterior diameter x Length x 0.52.



Axial plane - Anteroposterior dimension and the transverse dimensions.

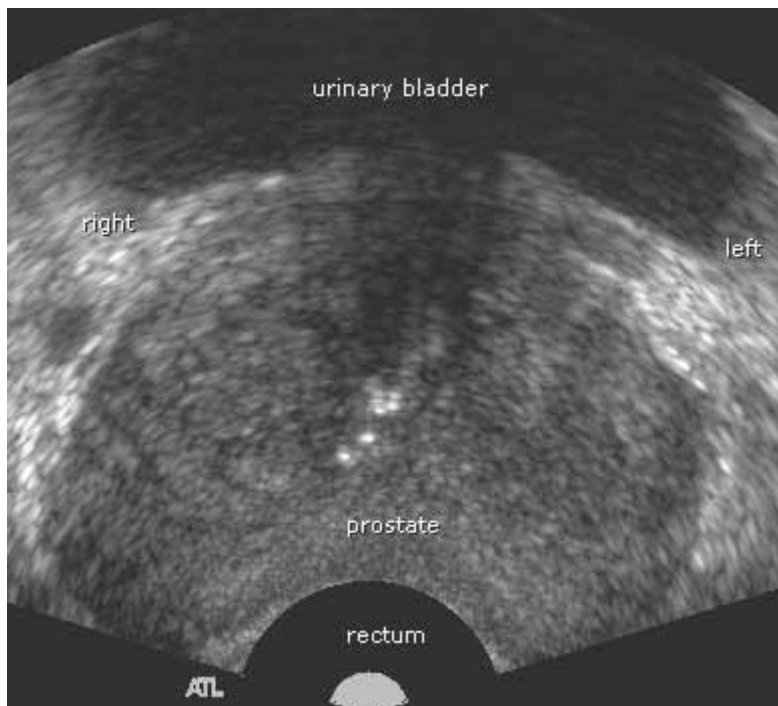
USG should be done in the full bladder so that prostate will be clearly delineated. USG has been done in the axial plane which shows the prostatic enlargement.

Antero-posterior and transverse dimensions of the prostate are recorded in this axial plane



Sagittal plane - Longitudinal dimension (measured just off the midline)

This picture shows USG done in the sagittal plane. Longitudinal dimension of the prostate is recorded in this plane



TRUS image of prostate

Procedure performed - TURP

Surgical therapy was mainly Transurethral resection of prostate (TURP). Procedure was done using monopolar current under spinal anesthesia. With the patient in lithotomy position, we do cystoscopy and assess the prostate grade and inspect the bladder for growth, stone and any signs of obstructions are seen. Resection was done using 24 fr Baumrucker resectoscope. We used water as irrigant fluid. At the end of the procedure coagulation was achieved and 22 fr 3 way Foleys catheterization done in all cases and irrigation started. We apply traction for all cases. Catheter will be removed for all the cases on 3rd or 4th post operative day. If the patient develops retention after catheter removal, we will recatheterise the patient and advised him to take alpha blocker and come for review after 1 week and give trial void.

Post operative variables (PVR, Uroflowmetry parameters) were compared. Post operative complications like urinary tract infection, sepsis, haematuria, blood transfusion, post operative LUTS, recatheterisation, length of hospital stay, stricture, and resurgery were recorded

OBSERVATION AND RESULTS

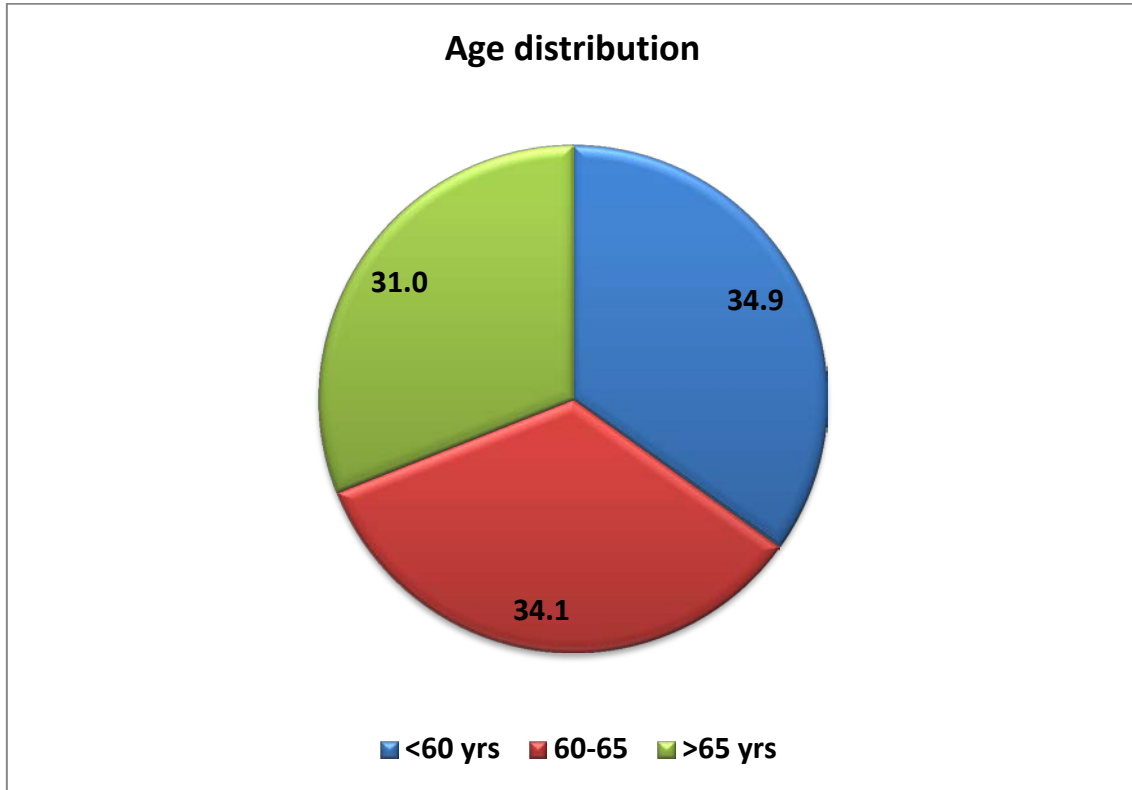
OBSERVATION AND RESULTS

The aim of our study was to compare the outcome and complications of post TURP between patients who presented with and without AUR. We compared the following factors of preoperative variables like age, presence of any co morbid illness, gland size, grade of the gland by DRE, serum PSA. And post operative variables like haematuria, need for blood transfusion, UTI, sepsis, recatheterisation rate, post operative irritative LUTS, PVR, length of hospital stay, lower urinary tract stricture , re surgery rate, TUR syndrome, Q max.

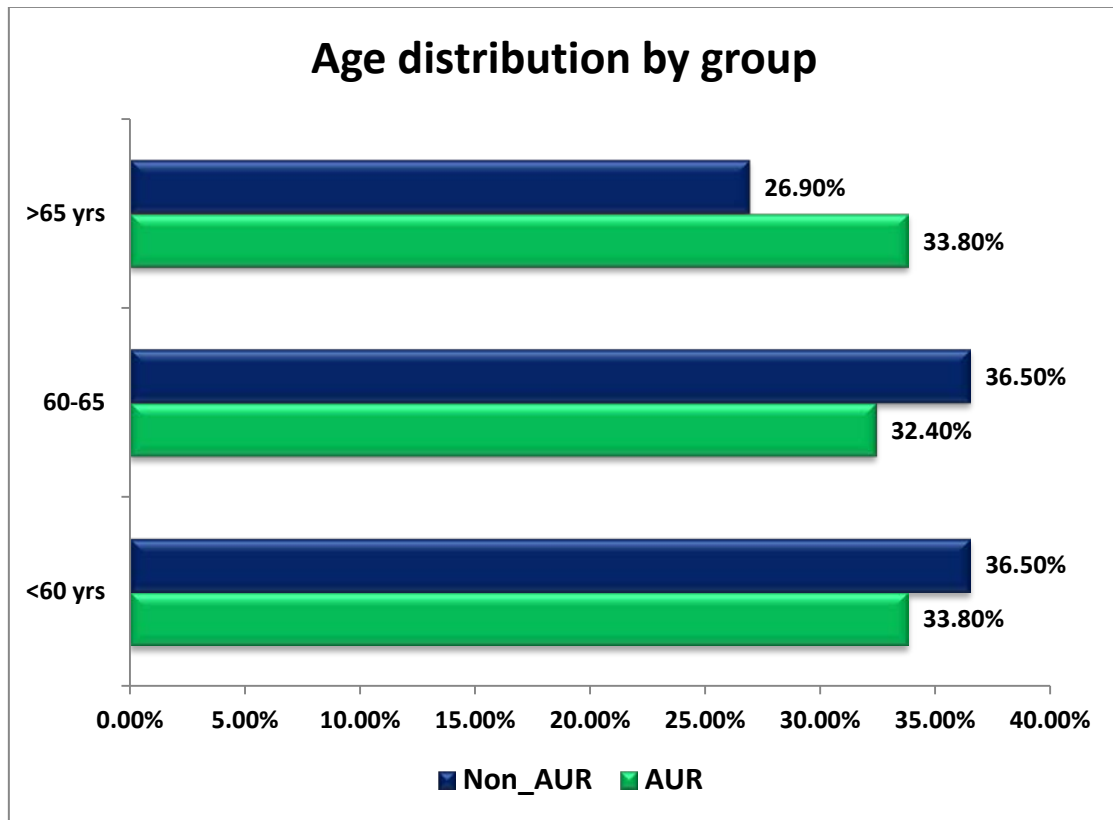
We enrolled 126 patients, out of which 74 were in AUR group and 52 in AUR minus group. We excluded patients with neurogenic illness, prostatic carcinoma. All patients were followed for a period of three months.

Statistical Methods: Summary statistics mean, standard deviation and percentage for the groups were computed. Chi-square test has been used to find the significance of study parameters on categorical scale between two groups. Results on continuous measurements are presented on Mean \pm SD... Student 't' test i.e. independent t-test has been used to determine the statistical significance between two group means. All analyses were two tailed and p <0.05 was considered significant. SPSS version 16.0 was used for data analysis

1 Age Distribution



In our study out of 126 patients, 34.9% belongs to less than 60 years and 34.1% between 61 and 65 years, and 31% of patients are more than 65 years.



In No AUR group 36.50% of patients were less than 60 years of age, 36.50% were between 60 and 65 years, 26.90% were more than 65.

In AUR group 33.80% were below 65, 32.40% were between 60 and 65, 33.80% were more than 65.

Table 1

Group	N	Mean	Std. Deviation	P-value
AUR	74	62.51	5.377	0.164
Non_AUR	52	61.06	6.242	

	Frequency	Percent
<60 yrs	44	34.9
60-65	43	34.1
>65 yrs	39	31.0
Total	126	100.0

Group * Age group Cross tabulation

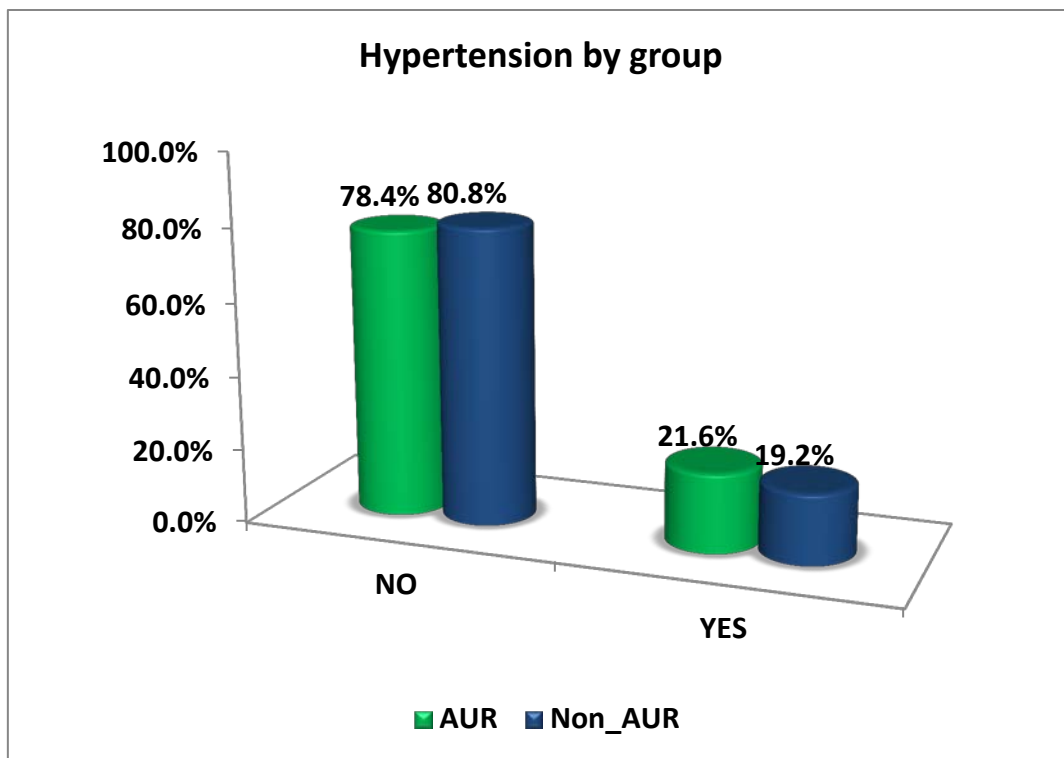
			Age group			Total
			<60 yrs	60-65	>65 yrs	
Group	AUR	Count	25	24	25	74
		% within Group	33.8%	32.4%	33.8%	100.0%
	Non_AUR	Count	19	19	14	52
		% within Group	36.5%	36.5%	26.9%	100.0%
Total		Count	44	43	39	126
		% within Group	34.9%	34.1%	31.0%	100.0%

P value – 0.711. It is not significant. So both groups are comparable with age. The mean age for patients with AUR is 62.51 and that for patients without AUR is 61.06

Table 2 Hypertension

	No	Yes	Total
With AUR	58	16	74
Without AUR	42	10	52
Total	100	26	126

Chart 2. HT



In our study 21.6% of patients with AUR had HT and 19.2% of patients without AUR had HT

Cross tabulation- HT

			HT		Total
			NO	YES	
Group	AUR	Count	58	16	74
		%	78.4%	21.6%	100.00%
	Non AUR	Count	42	10	52
		%	80.8%	19.2%	100.00%
Total			100	26	126
Percentage			79.4%	20.6%	100.00%

Chi square test

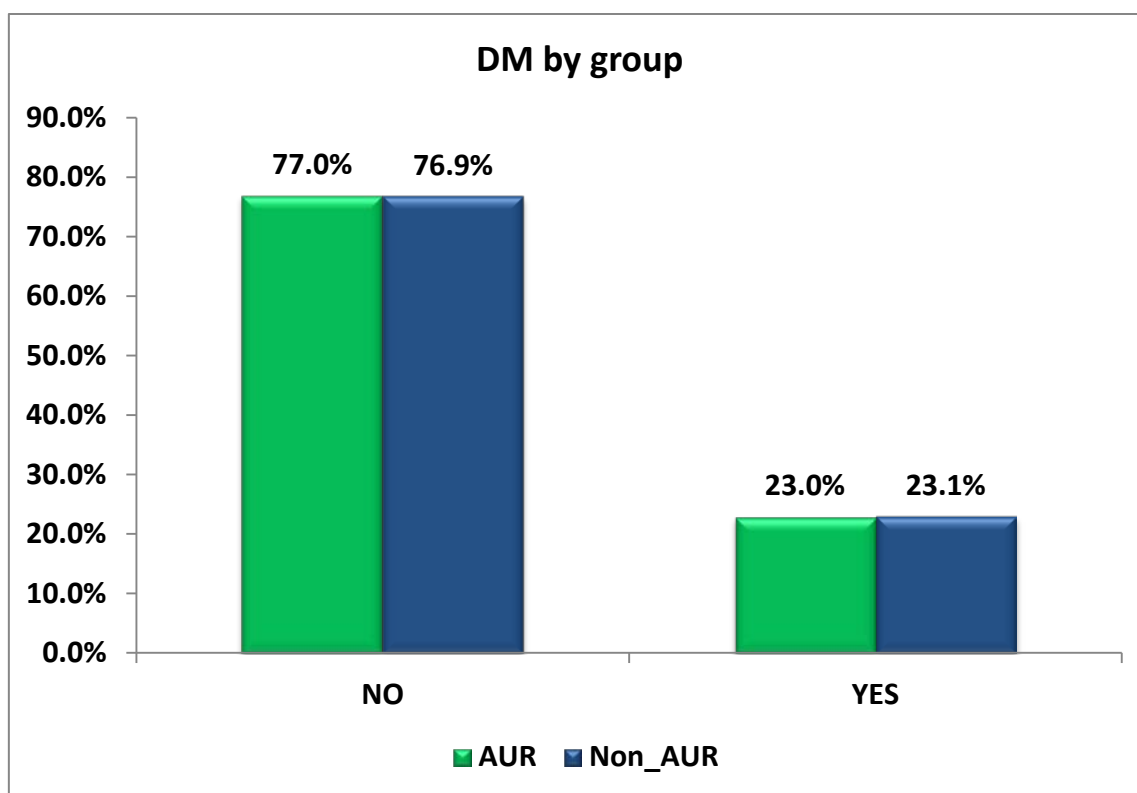
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.107 ^a	1	.744		
Continuity Correction ^b	.011	1	.918		
Likelihood Ratio	.107	1	.743		
Fisher's Exact Test				.825	.462
linear-by-Linear Association	.106	1	.745		
N of Valid Cases ^b	126				

P value – 0.918 P value is not significant and hence both groups are comparable in relation to the hypertension

Table 3 Diabetes mellitus

	No	Yes	Total
With AUR	57	17	74
Without AUR	40	12	52
Total	97	29	126

Chart 3. Diabetes mellitus



In our study 23.0% of patients who presented with acute urinary retention had DM as comorbid condition and 23.1% of patients without AUR had DM, almost both groups are same

DM group-Cross tabulation

			DM		Total
			NO	YES	
Group	AUR	Count	57	17	74
		%	77.00%	23.00%	100.00%
	Non	Count	40	12	52
		%	76.90%	23.10%	100.00%
Total			97	29	126
Percentage			77.00%	23.00%	100.00%

Statistics

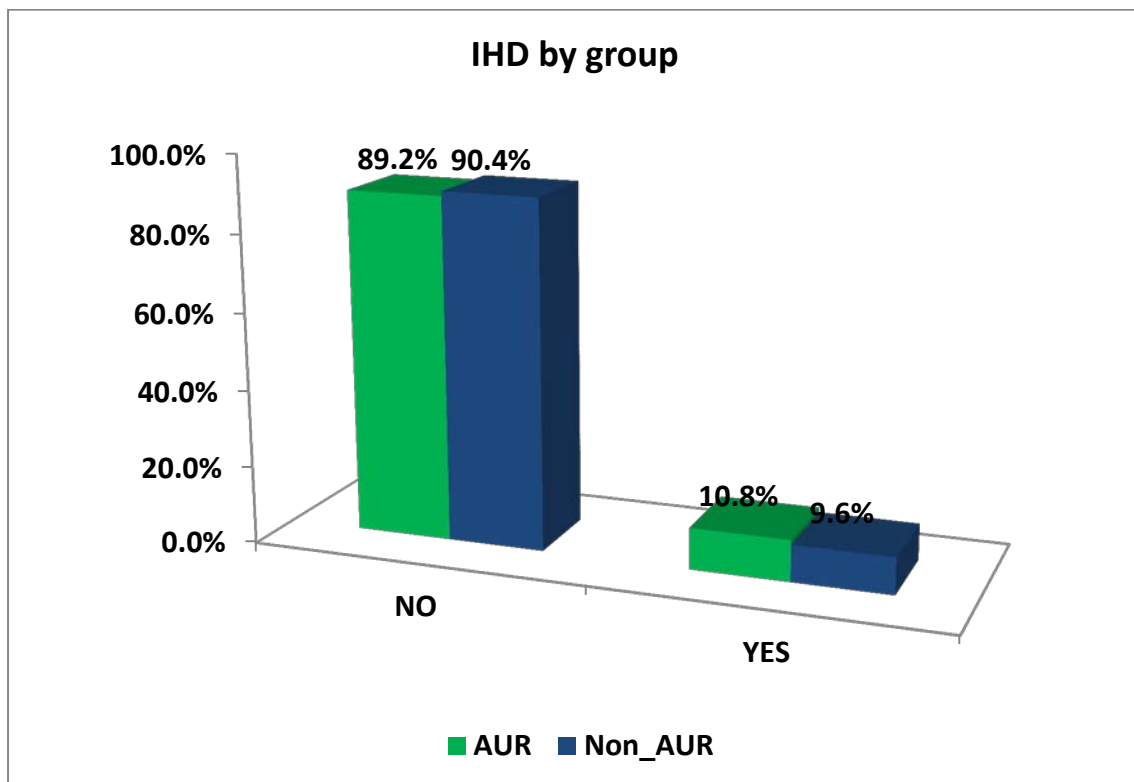
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.000 ^a	1	.989		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.000	1	.989		
Fisher's Exact Test				1.000	.577
Linear-by-Linear Association	.000	1	.989		
N of Valid Cases ^b	126				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.97.					
b. Computed only for a 2x2 table					

P value 1.000. There was no statistical significance as the p value is 1.000 and so the two groups are comparable in relation to the DM. so in our study the DM status has not affected the comparison

Table 4 IHD

	No	Yes	Total
With AUR	66	8	74
Without AUR	47	5	52
Total	113	13	126

Chart4. IHD



In our study 10.8% of patients with AUR suffered from IHD, whereas 9.6% of patients without AUR had IHD. If the patient was on any antiplatelet drugs, we will ask them to stop one week before the procedure

IHD group –Cross tabulation

			IHD		Total
			NO	YES	
Group	AUR	Count	66	8	74
		%	89.2%	10.8%	100.0%
	Non AUR	Count	47	5	52
		%	90.4%	9.6%	100.0%
Total			113	13	126
Percentage			89.7%	10.3%	100%

Statistics

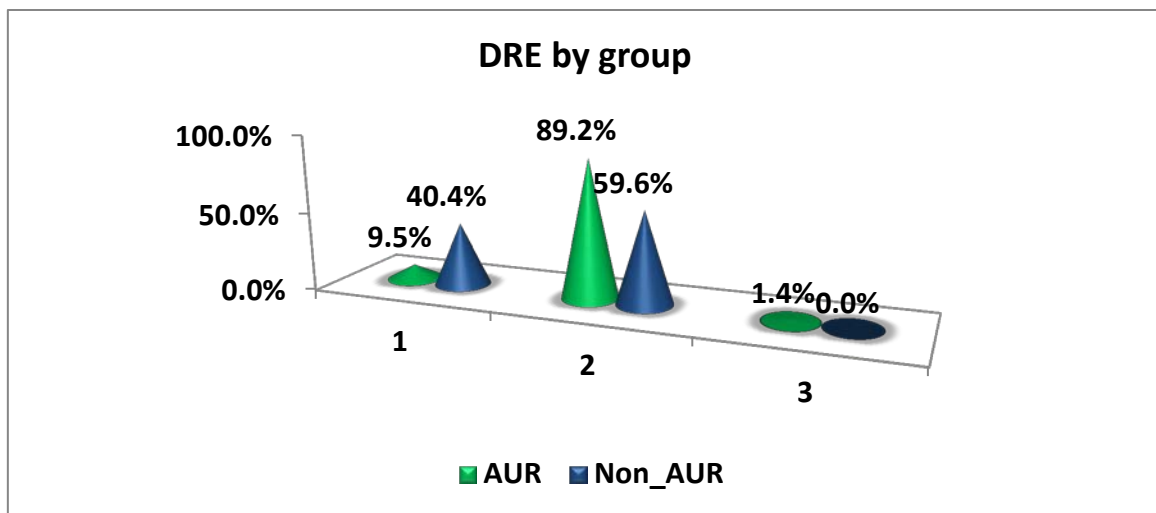
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.047 ^a	1	.828		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.047	1	.828		
Fisher's Exact Test				1.000	.537

P value – 1.000 There was no statistical significance as the p value is 1.000 and so the two groups are comparable in relation to the IHD.

Table 5 DRE

	Grade I	Grade II	Grade III	Total
With AUR	7	66	1	74
Without AUR	21	31	0	52
Total	28	97	1	126

Chart 5. DRE



Regarding the grading of prostate by DRE, 9.5% of patients with AUR and 40.4% without AUR had grade I enlargement. 89.2% with AUR and 59.6% without AUR had grade II enlargement. 1.4% with AUR and no patients in AUR minus group had grade III enlargement

Cross tabulation - DRE grading

			DRE			Total
			Grade I	Grade II	Grade III	
Group	AUR	Count	7	66	1	74
		%	9.5%	89.2%	1.4%	100.0%
	Non AUR	Count	21	31	0	52
		%	40.4%	59.6%	0%	100.0%
Total			28	97	1	126
Percentage			22.2%	77.0%	0.8%	100%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.315 ^a	2	.000
Likelihood Ratio	17.769	2	.000
Linear-by-Linear Association	17.131	1	.000
N of Valid Cases	126		

P value 0.000 In our study most of the patients with AUR had grade II enlargement of the prostate. In patients without AUR, they had both grade I and grade II enlargement with grade II outnumbered grade I

Table 6 Volume and serum PSA

Group statistics of volume and serum PSA

Student T test

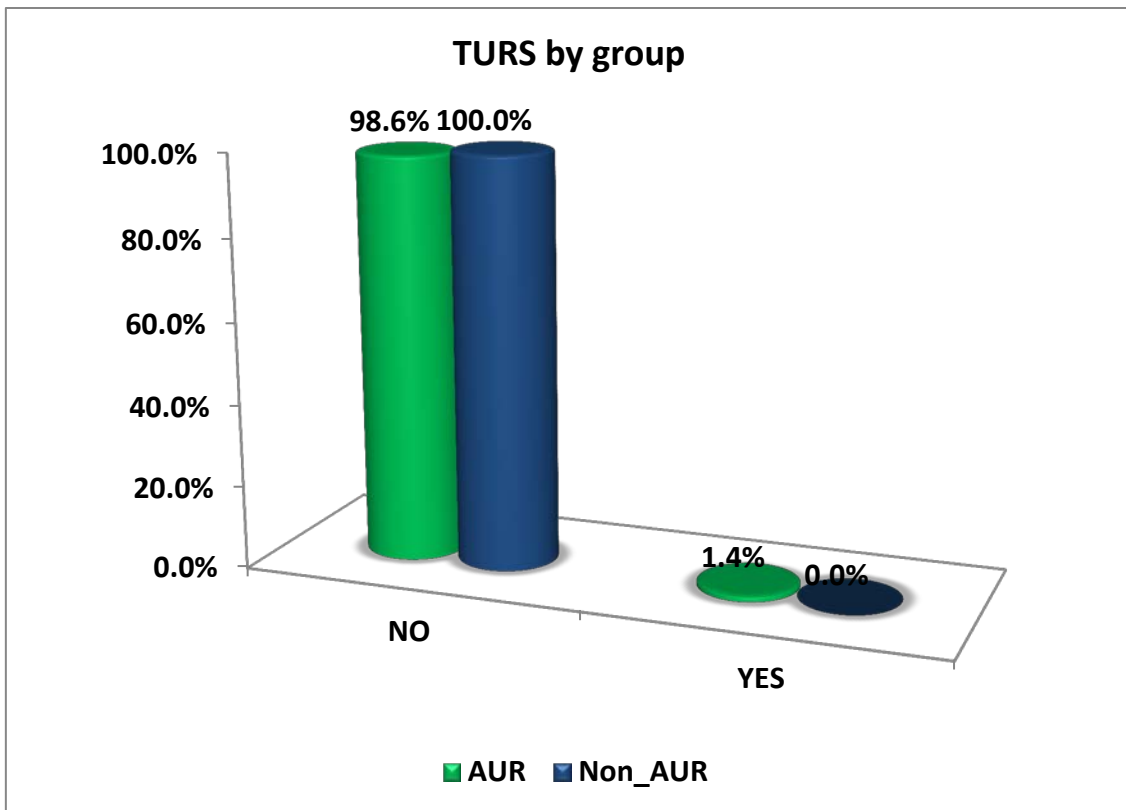
	Group	N	Mean	Std. Deviation	P-value
Volume CC	AUR	74	53.20	4.382	0.000
	Non_AUR	52	44.21	5.211	
PSA	AUR	74	3.357	.4863	0.006
	Non_AUR	52	3.094	.5731	

Volume of the gland, serum PSA level was statistically significant in our study as evidenced by the p value.

Table 7 TUR syndrome

	No	Yes	Total
With AUR	73	1	74
Without AUR	52	0	52
Total	125	1	126

Chart 7 TUR syndrome



Only one patient in AUR group developed TUR syndrome

TUR syndrome group

Cross tabulation

			TUR syndrome		Total
			NO	YES	
Group	AUR	Count	73	1	74
		% within Group	98.6%	1.4%	100.0%
	Non_AUR	Count	52	0	52
		% within Group	100.0%	.0%	100.0%
Total		Count	125	1	126
		% within Group	99.2%	.8%	100.0%

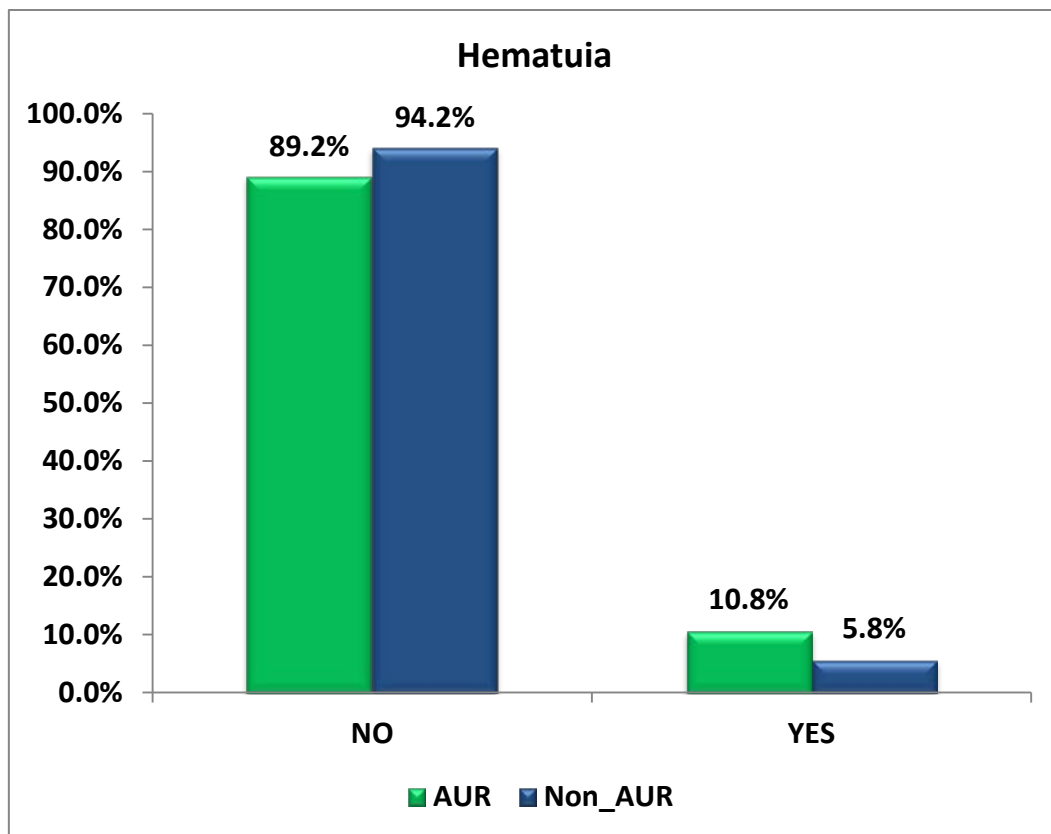
P value – 1.00

TUR syndrome occurred only in one patient in AUR group at the end of surgery. Serum electrolytes were done which showed dilutional hyponatremia.

Table 8 Haematuria

	No	Yes	Total
With AUR	66	8	74
Without AUR	49	3	52
Total	115	11	126

Chart 8. Haematuria



In our study 10.8% of patients who presented with AUR had persistent haematuria after TURP, whereas 5.8% of patients without AUR had haematuria

Haematuria group - Cross tabulation

			Haematuria		Total
			NO	YES	
Group	AUR	Count	66	8	74
		%	89.2%	10.8%	100.0%
	Non AUR	Count	49	3	52
		%	94.2%	5.8%	100.0%
Total			115	11	126
Percentage			91.3%	8.7%	100%

Statistics

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.974 ^a	1	.324		
Continuity Correction ^b	.444	1	.505		
Likelihood Ratio	1.020	1	.313		
Fisher's Exact Test				.523	.257
Linear-by-Linear Association	.966	1	.326		
N of Valid Cases ^b	126				

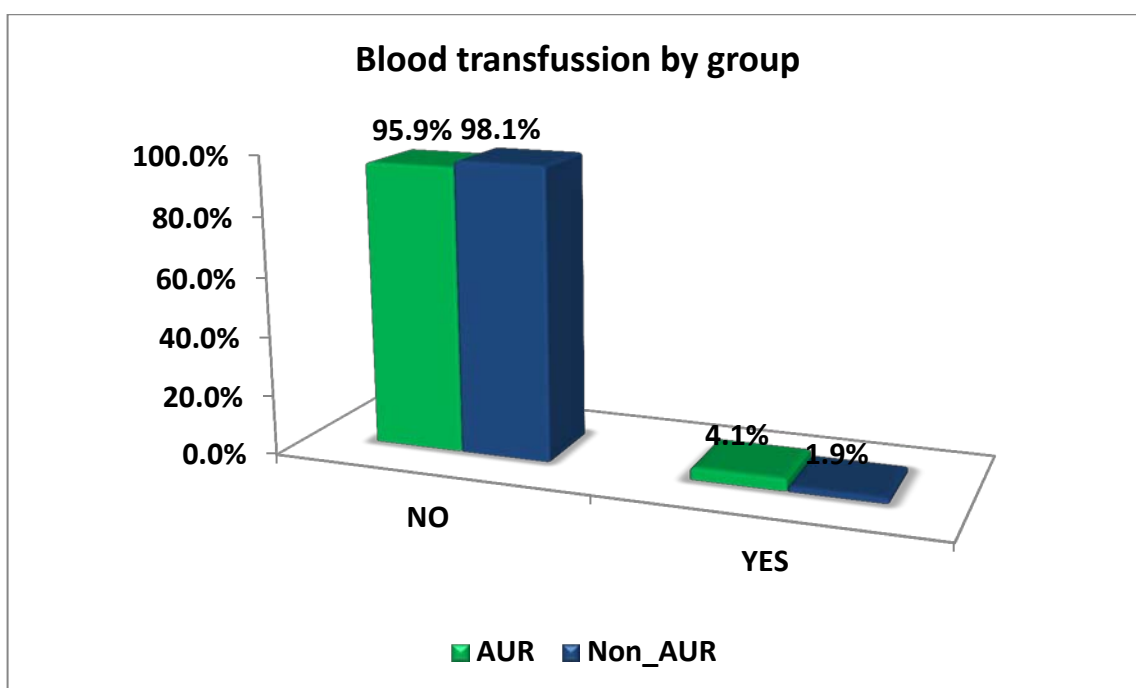
P value 0.523

After TURP 10.8% of the patients who presented with acute urinary retention had persistent haematuria, where was in the AUR minus group only 5.8% had significant haematuria. Haematuria is not statistically significant in AUR group as evidenced by the P value of 0.523

Table 9 Blood transfusion

	No	Yes	Total
With AUR	71	3	74
Without AUR	51	1	52
Total	122	4	126

Chart 9. Blood transfusion



In our study 4.1% of patients in AUR group needed blood transfusion due to persistent haematuria, whereas 1.9% of patients without AUR needed blood transfusion

Blood transfusion- Cross tabulation

			Blood transfusion		Total
			NO	YES	
Group	AUR	Count	71	3	74
		%	95.9%	4.1%	100.0%
	Non AUR	Count	51	1	52
		%	98.1%	1.9%	100.0%
Total			122	4	126
Percentage			96.8%	3.2%	100%

Chi-Square Tests

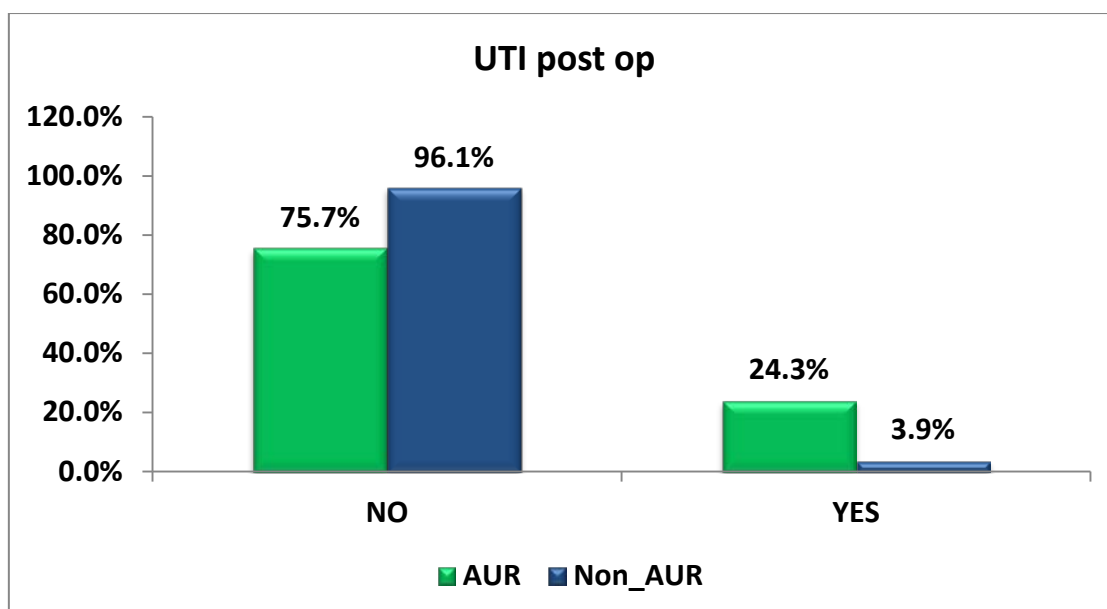
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.451 ^a	1	.502		
Continuity Correction ^b	.024	1	.876		
Likelihood Ratio	.479	1	.489		
Fisher's Exact Test				.642	.452
Linear-by-Linear Association	.448	1	.503		
N of Valid Cases ^b	126				

P value – 0.642 Difference between the need of blood transfusion between the two groups is not statistically significant as evidenced by the p value

Table 10. Post op UTI

	No	Yes	Total
With AUR	56	18	74
Without AUR	50	2	52
Total	106	20	126

Chart 10. Post operative UTI



In our study around one fourth of the patients that is 24.3% of patients in AUR group suffered from UTI after TURP. This was quiet low in patients without AUR, developed only in 3.9%

Post operative UTI

Cross tabulation

			UTI- post op		Total
			0	1	
Group	AUR	Count	56	18	74
		% within Group	75.7%	24.3%	100.0%
	Non_AUR	Count	50	2	52
		% within Group	96.2%	3.8%	100.0%
Total		Count	106	20	126
		% within Group	84.1%	15.9%	100.0%

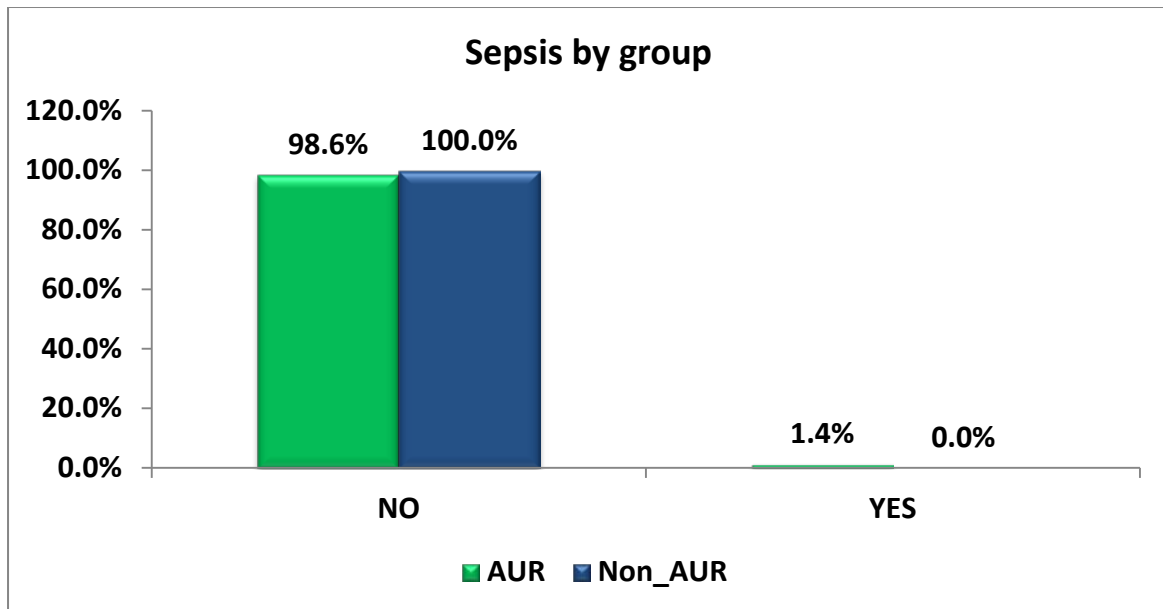
P value – 0.004

Of the total patients post operative UTI occur in 15.9% of patients. 24.3% of patients who presented with urinary retention developed UTI after TURP, where as it occurred only in 3.8% of patients who presented without urinary retention. This difference was statistically significant as evidenced by the p value of 0.004.

Table 11 Sepsis

	No	Yes	Total
With AUR	73	1	74
Without AUR	52	0	52
Total	125	1	126

Chart 11 Sepsis



Only one patient in AUR group developed urosepsis following TURP

Sepsis group – Cross tabulation

			Sepsis		Total
			NO	YES	
Group	AUR	Count	73	1	74
		%	98.6%	1.4%	100.0%
	Non AUR	Count	52	0	52
		%	100%	0%	100.0%
Total			125	1	126
Percentage			99.2%	0.8%	100%

Statistics

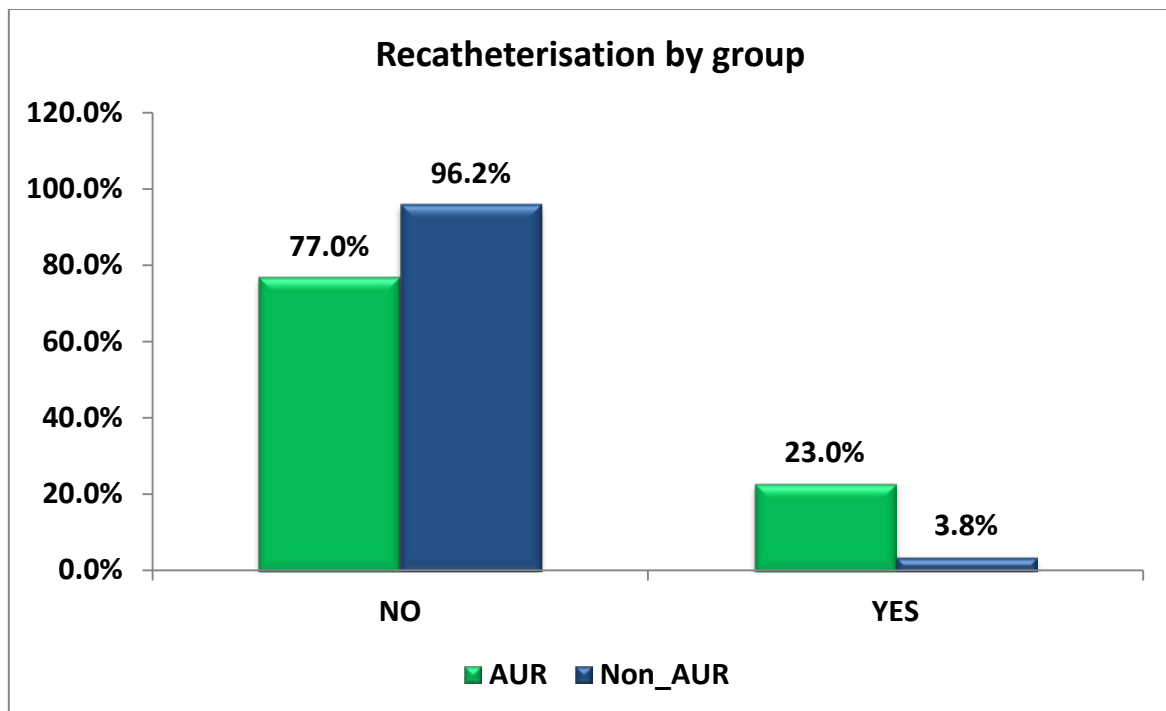
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.708 ^a	1	.400		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	1.070	1	.301		
Fisher's Exact Test				1.000	.587
Linear-by-Linear Association	.703	1	.402		
N of Valid Cases ^b	126				

P value – 1.00 Sepsis occurred in only one patient in the AUR group, who was appropriately treated with higher antibiotics. There was no sepsis incident in patients without AUR.

Table 12 Recatheterisation

	No	Yes	Total
With AUR	57	17	74
Without AUR	50	2	52
Total	107	19	126

Chart 12 Recatheterisation



Recatheterisation after catheter removal following TURP was quite higher for patients who presented with AUR. 23.0% of patients in this group needed recatheterisation. This was low in patients without AUR.

Recatheterisation group

Cross tabulation

			Recatheterisation		Total
			NO	YES	
Group	AUR	Count	57	17	74
		% within Group	77.0%	23.0%	100.0%
	Non_AUR	Count	50	2	52
		% within Group	96.2%	3.8%	100.0%
Total		Count	107	19	126
		% within Group	85.0%	15.0%	100.0%

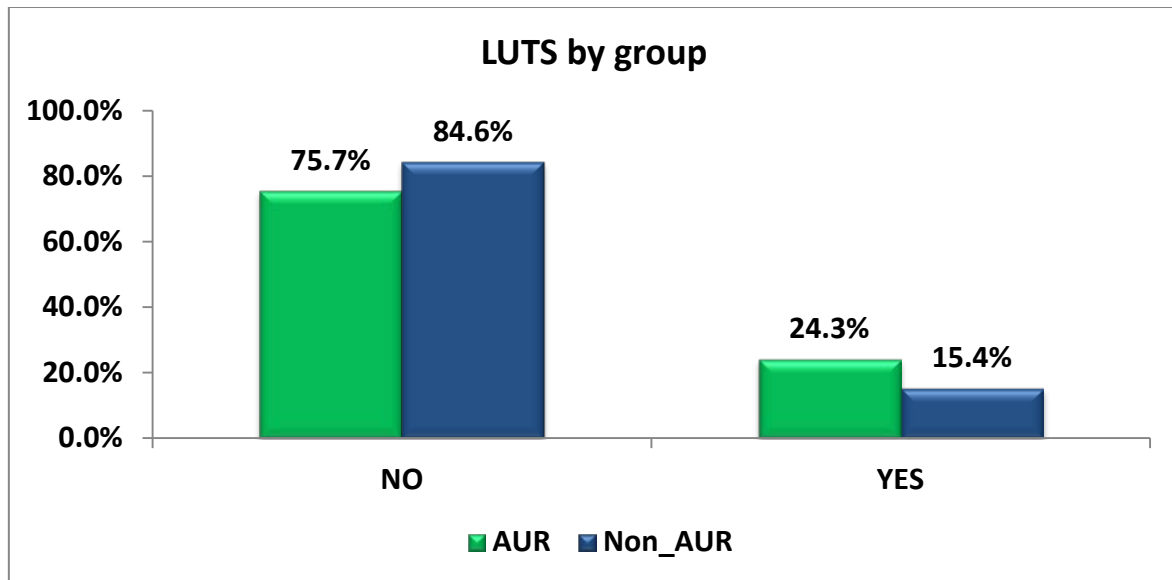
P value 0.007

Recatheterisation rate was 23.0% in AUR group, where as it was only 3.8% in AUR minus group after TURP. This difference in recatheterisation rate was statistically significant as evidenced by the p value of 0.007

Table 13 Irritative LUTS

	No	Yes	Total
With AUR	56	18	74
Without AUR	44	8	52
Total	100	26	126

Chart 13 LUTS



18 patients in the AUR group developed irritative lower urinary tract symptoms like incontinence, increased frequency and urgency. In the AUR minus group only 8 patients developed irritative LUTS

LUTS group -Cross tabulation

			LUTS		Total
			NO	YES	
Group	AUR	Count	56	18	74
		%	75.7%	24.3%	100.0%
	Non AUR	Count	44	8	52
		%	84.6%	15.4%	100.0%
Total			100	26	126
Percentage			79.4%	20.6%	100%

Statistics

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.490 ^a	1	.222		
Continuity Correction ^b	.994	1	.319		
Likelihood Ratio	1.530	1	.216		
Fisher's Exact Test				.268	.159
Linear-by-Linear Association	1.478	1	.224		

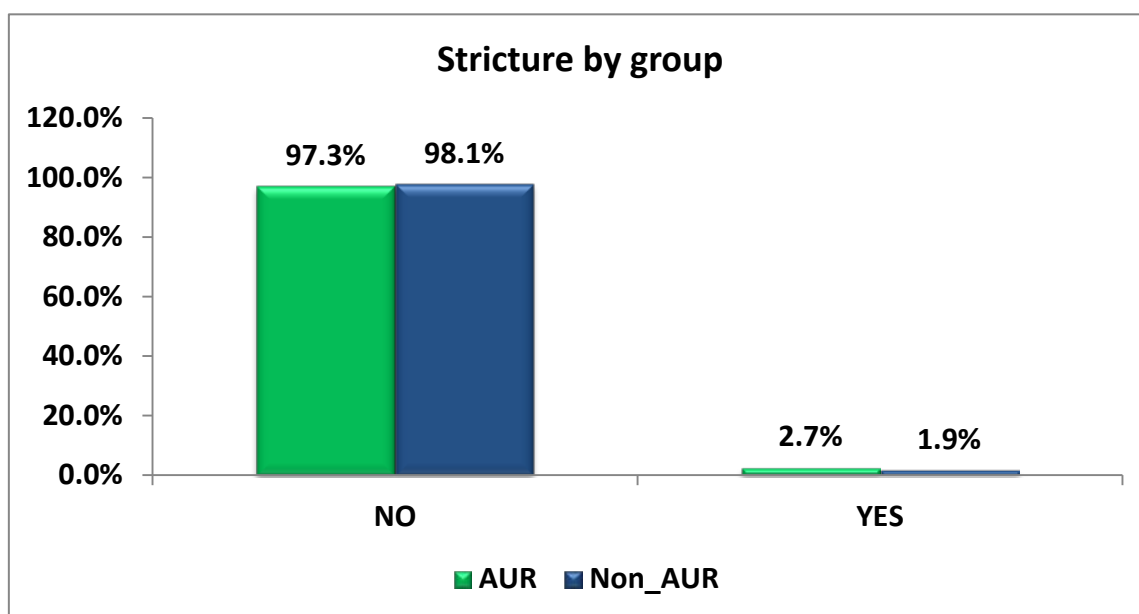
P value 0.319

The difference between the two groups is not statistically significant as evidenced by p value as for as the irritative LUTS is concerned.

Table 14. Lower urinary tract stricture

	No	Yes	Total
With AUR	72	2	74
Without AUR	51	1	52
Total	123	3	126

Chart 14. Stricture



In our study 2 patients in AUR group and one patient in non AUR group developed stricture during 3 months of follow up

Stricture group- Cross tabulation

			Stricture		Total
			NO	YES	
Group	AUR	Count	72	2	74
		%	97.3%	2.7%	100.0%
	Non AUR	Count	51	1	52
		%	98.1%	1.9%	100.0%
Total			123	3	126
Percentage			97.6%	2.4%	100%

Statistics

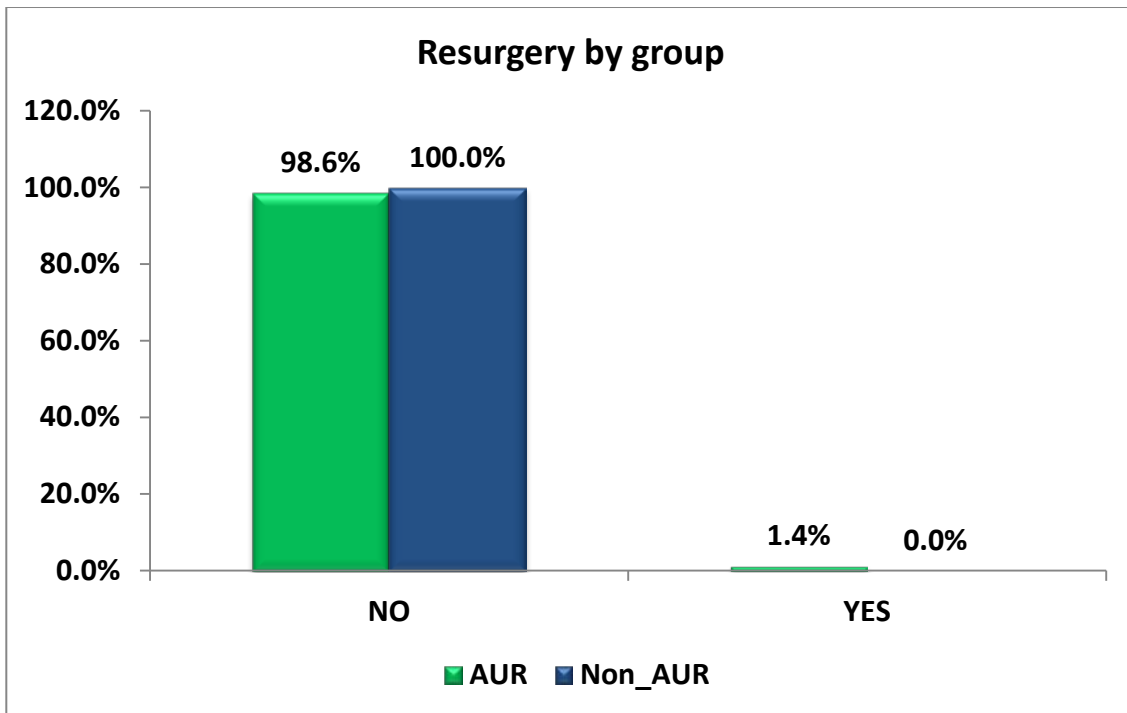
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.080 ^a	1	.777		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.082	1	.775		
Fisher's Exact Test				1.000	.631
Linear-by-Linear Association	.079	1	.778		
N of Valid Cases ^b	126				

P value – 1.000 statistically not significant

Table 15. Re surgery

	No	Yes	Total
With AUR	73	1	74
Without AUR	52	0	52
Total	125	1	126

Chart 15 Resurgery



In our study only one patient in AUR group required re surgery for clot retention

Resurgery group- Cross tabulation

			Resurgery		Total
			NO	YES	
Group	AUR	Count	73	1	74
		%	98.6%	1.4%	100.0%
	Non AUR	Count	52	0	52
		%	100%	0%	100.0%
Total			125	1	126
Percentage			99.2%	0.8%	100%

Statistics

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.708 ^a	1	.400		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	1.070	1	.301		
Fisher's Exact Test				1.000	.587

P value – 1.000 not statistically significant

Table 16 Group statistics length of hospital stay

	Group	N	Mean	Std. Deviation	P-value
Lenth of stay	AUR	74	7.00	1.579	0.000
	Non_AUR	52	4.56	.777	

Statistics

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Length of stay	Equal variances assumed	28.537	.000	10.302	124	.000	2.442	.237	1.973	2.912

Length of hospital stay was statistically significant in our study as evidenced by the p value 0.000

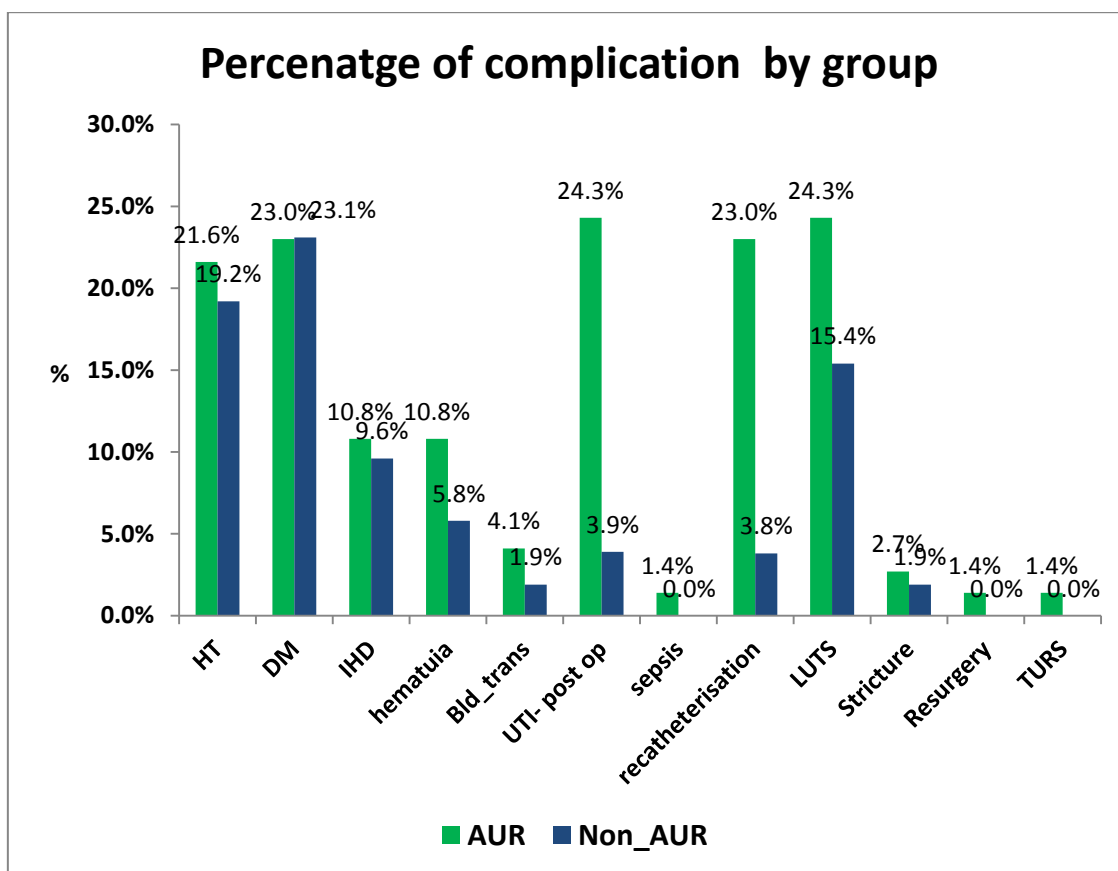
Table 17 Group statistics of PVR and Q max

	Group	N	Mean	Std. Deviation	P-value
PVR	AUR	74	14.31	2.970	0.062
	Non_AUR	52	13.32	2.551	
Qmax	AUR	74	19.22	1.485	0.947
	Non_AUR	52	19.20	1.485	

Mean PVR in AUR and non AUR groups were 14.31 and 13.32 ml respectively. There is no much difference between these two groups as for as the PVR is concerned. So it is not statistically significant.

Q max is also almost the same between these two groups. We excluded the patients who developed recurrent retention

Bar chart shows the comparisons of all variables.



Master table comparing all variables with p value

Sr .no	Variables	With AUR In %	Without AUR In %	P value
1	HT	21.6	19.2	0.918
2	DM	23.0	23.1	1.000
3	IHD	10.8	9.6	1.000
4	Volume(mean)	53.20ml	44.21 ml	0.000
5	PSA(mean)	3.357	3.094	0.006
6	TUR sundrome	1.4	0.0	1.00
7	Haematuria	10.8	5.8	0.523
8	Blood transfusion	4.1	1.9	0.642
9	UTI – Post op	24.3	3.8	0.004
10	Sepsis	1.4	0.0	1.000
11	Recatheterisation	23.0	3.8	0.007
12	Irritative LUTS	24.3	15.4	0.319
13	Stricture	2.7	1.9	1.000
14	Re surgery	1.4	0.0	1.000
15	Length of stay(mean)	7	4.56	0.000
16	PVR(mean)	14.31	13.32	0.062
17	Q max(mean)	19.22	19.20	0.947

DISCUSSION

DISCUSSION

Benign prostatic hyperplasia is a common urological problem affecting men in older age group. Acute urinary retention may be the presenting symptom. The prevalence rate of AUR in men with BPH varies. In western countries, the incidence rate was lower, ranging from 20 to 40%. Where as in developing countries the rate was quiet higher, can reach even more than 50%. The reason for the increased incidence of AUR in men with BPH in developing countries is unawareness of the symptom of BPH, fear of surgery, and cost factors. Chen JS and Chang CH et al from Taiwan conducted a retrospective study and found that post TURP complications were more in patients who presented with acute urinary retention when compared to those who presented without retention. Sajjad Ahmed from post graduate institute from Lady reading hospital Peshawar, Pakistan conducted a study and found that the chance of post TURP complication are more with those patients who present with acute urinary retention . There are few more studies which found that the complication rates are more for the patients with acute urinary retention. The purpose of this study is to found that whether there is any difference in the Post TURP complications and outcome of surgery for BPH for patients with and without acute urinary retention in our population, so that we can prevent and make ourselves as well as the patient to get ready to tackle these complications and create awareness among people.

In our study we enrolled 126 patients diagnosed as BPH with their symptoms, clinical examinations, uroflowmetry and USG. Of these 126 patients, 74 presented with AUR and 52 present without retention. We compared the following factors of preoperative variables like age, presence of any co morbid illness, gland size, grade of the gland by DRE, serum PSA. And post operative variables like haematuria, need for blood transfusion, UTI, sepsis, recatheterisation rate, PVR, length of hospital stay, lower urinary tract stricture , re surgery rate, TUR syndrome, Q max.

Age distribution

In our study men aged between 40 to 70 years were included. Of these the mean age for men who presented with AUR was 62.51 and for men without AUR were 61.06. The p value for the mean age is 0.164 which was not significant. So both the groups are comparable with age. Study done by Kurita et al also showed that there is no statistical difference between these two groups based on age. Whereas other studies like Olmsted county study, Meigs et al study and the study done by Berges et al showed that AUR occur more common in older age group.

Co-morbid illness

Regarding the co morbid factors, HT occurs in 21.6% of patients with AUR and 19.2% of patients without AUR. The two groups are comparable as for as the HT is concerned as the p value is 0.91 which is not significant. DM

occurs in 23% of patients with AUR and in 23.1% of patients without AUR. The p value here is 1.000- Not significant. 10.8% of the patients with AUR and 9.6% of patients without AUR had IHD with a P value of 1.000. So in our study both groups are comparable in co morbid illness. Few studies showed that presence of co morbid factors may be confounding factors.

TUR syndrome

Only one patient in the AUR group developed TUR syndrome immediately at the end of the procedure. It was suspected clinically and serum electrolytes were done which showed hyponatremia and it was corrected. No patients in AUR minus group developed this syndrome.

Haematuria

In our study 10.8 % of patients with AUR and 5.8% of patients without AUR had persistent haematuria after TURP. The p value is 0.523 which is not significant.

Jeng- Sheng- Chen et al study showed haematuria in 8.1% of patients with AUR and 7.4% of patients without AUR. Our study is more or less similar to this one.

Mebust et al study showed haematuria and blood transfusion in 6.4%, Kuntz et al showed 2%, where as it was higher in a study done by Doll et al- 22%

Blood transfusion

Blood transfusion rate was 4.1% and 1.9 % for patients with and without AUR respectively with a p value of 0.642 which is not significant.

Jeng- Sheng- Chen et al study showed blood transfusion rate of 3.2% and 1.5% for patients who presented with and without AUR.

Post operative UTI

We did urine culture and sensitivity for all our patients post operatively. In our study 24.3% of patient with AUR and only 3.9% of patients without AUR had UTI as documented by urine culture. These patients were given a course of culture specific antibiotics. The occurrence of UTI is higher in patients with AUR with a p value of 0.004 which is significant. The reason for this increased occurrence of UTI may be due to prolonged catheterization and hospital stay in patients with AUR.

Jeng- Sheng- Chen et al study reported the UTI rate as 18.6% in AUR group and 15.6% in AUR minus group. Mebust et al showed 3.9%, Borboroglu et al showed 4%, whereas it was quiet higher in Doll et al study which showed 25%

Sepsis

In our study only one patient (1.4%) with AUR developed sepsis after TURP. No patient without AUR had sepsis. Patient was treated intensively with

IV fluids and higher antibiotics. Jeng- Sheng- Chen et al study reported sepsis in 1.4% only in patients with AUR group. Mebust et al and Haupt et al showed urosepsis in 0.2% of patients after TURP. Doll et al showed 3% urosepsis.

Recatheterisation

In our study 23% of patients with AUR developed urinary retention after catheter removal in TURP, which was quiet higher when compared to 3.8% of patients without AUR. This is statistically significant with a p value of 0.007. If the patient develops urinary retention, we will recatheterise the patient and put him on alpha blocker and give trial void after 1 week. All of our patients responded well in trial voiding.

Jeng- Sheng- Chen et al study showed recatheterisation rate in 13.8% and 0% for patients with and without AUR respectively. Mebust et al has 6.5%, Doll et al 3% Borboroguli et al 7.1% recatheterisation rate after TURP. The reason for increased rate of recatheterisation in patients with AUR may be due to hypoactive detrusor after chronic obstruction, inadequate resection due to increased gland size, or early cessation of procedure due to patient factor.

LUTS

18 (24.3%) patients in the AUR group developed irritative lower urinary tract symptoms like incontinence, increased frequency and urgency. In the AUR minus group only 8(15.4%) patients developed irritative LUTS. P value 0.319

The difference between the two groups is not statistically significant as evidenced by p value as for as the irritative LUTS is concerned

Lower urinary tract stricture

In our study totally 3 patients developed lower urinary tract stricture 2(2.7%) in the AUR arm and 1(1.9%) in the non AUR arm. This was diagnosed 2 to 3 months after TURP, when the patient c/o thin stream and strain to void. We did AUG for these patients and diagnosed the stricture. We advised optical internal urethrotomy for these patients. These 3 patients were not willing for urethrotomy; hence dilatation was done. The reasons for the stricture formation may be due to instrumental injury, diathermy injury during TURP or due to prolonged catheterization.

Jeng- Sheng- Chen et al study showed 2.6% and 3.2% for patients with and without AUR.

Re surgery

Only one patient (1.4%) in our study developed clot retention. Cystoscopic clot evacuation was attempted, which could not be possible. Then open surgical evacuation was done and prostatic fossa was packed. The pack was removed after 2days, bleeding has stopped.

Mean length of hospital stay

It was 7 and 4.56 days for patients with and without AUR. This was statistically significant.

Post operative PVR

Mean post operative PVR for patients with and without AUR was 14.31ml and 13.32 ml respectively. The p value was 0.062 which was not significant statistically.

Q max

We did Uroflow for all of our patients who voided after TURP to compare the flow pattern of urine. The mean Q max was 19.22ml/sec and 19.20ml/sec for patient with and without AUR. The p value is 0.947 which was not significant.

CONCLUSION

CONCLUSIONS

Our study is a prospective observational analytical study to compare the post TURP complication and outcome of patients with and without AUR. Our study clearly shows that post TURP complications like persistent haematuria, blood transfusion rate, post op UTI, sepsis, recatheterisation, lower urinary tract stricture, resurgery, TUR syndrome, length of hospital stay were higher in patients who presented with AUR than patients without AUR. Of these complications, post TURP UTI, recatheterisation rate and length of hospital stay were statistically significant in AUR group when compared to AUR minus group. So it is better to intervene earlier before the patients develop AUR in order to minimize the complications and to maximize the outcome.

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BIBLIOGRAPHY

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ANNEXURES

INSTITUTIONAL ETHICAL COMMITTEE
GOVT.KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID.No.4/10/2014
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A comparative study of post TURP outcome and complications between BPH patients presenting with or without acute urinary retention submitted by Dr.K. Senthilnathan, Dept. of Urology, PG Student, KMC, Chennai-10.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.



[Handwritten signature in red ink]
27/11/2014

CHAIRMAN,
Ethical Committee
Govt.Kilpauk Medical College, Chennai

[Handwritten signature in black ink]
28/11/2014

ANNEXURE: 2

PROFORMA

NAME:

AGE:

SEX:

ADDRESS:

IP.NO:

D.O.A:

D.O.S:

D.O.D:

PRESENTING COMPLAINTS:

H/O AUR

IPSS SCORE:

GENERAL EXAMINATION:

P.R:

B.P:

PER ABDOMEN:

PER RECTAL:

INVESTIGATIONS:

HB%:

PCV%

BLOOD: UREA- SUGAR

SERUM CREATININE-

Sr ELECTROLYTES

Sr PSA

URINE C/S:

USG KUB: PROSTATE SIZE:

PVR

UROFLOW: Qmax:

AFR:

Voided Volume:

CYSTOSCOPY:

Presence of lateral and median lobes – Grade

Presence of intravesical extension

Length of prostatic urethra

OPERATIVE PROCEDURE:

Operative time: Irrigation:

POST OP.PERIOD:

CATHETER REMOVAL:

USG:

FOLLOW UP:

IPSS SCORE:

UROFLOW: Qmax AFR Voided Volume

BIOPSY

ANNEXURE 3

சுய ஒப்புதல் படிவம்

ஆய்வு செய்யப்படும் தலைப்பு:

சிறுநீரக அறுவை சிகிச்சை பிரிவு

கீழ்ப்பாக்கம் மருத்துவக் கல்லூரி

பங்கு பெறுபவரின் பெயர்

பங்கு பெறுபவரின் எண்

பங்கு பெறுபவர் இதனை (V) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது.

என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டுள்ளது என அறிந்து கொண்டேன்.

நான் இவ்வாய்வில் தன்னிச்சையாக தான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த சட்டசிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்தும் கொண்டேன்.

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்து மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்கு பெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவலையோ, முடிவையோ பயன்படுத்திக் கொள்ள மறுக்கமாட்டேன்.

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக் கொள்கிறேன். ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்றும் உறுதியளிக்கிறேன்.

இந்த ஆய்வில் ஒருமுறை 5 மி இரத்தம் பரிசோதனைக்காக எடுத்துக் கொள்ளப்படும் என்பதை அறிவேன்.

பங்கேற்பவரின் கையொப்பம் _____ இடம் _____
தேதி இடம் _____ தேதி _____

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்
சாட்சியாளரின் கையொப்பம்

இடம் _____ தேதி _____
சாட்சியாளரின் பெயர் மற்றும் விலாசம்

ஆய்வாளரின் கையொப்பம்
இடம் _____ தேதி _____

ஆய்வாளரின் பெயர் _____

MASTER CHART

MASTER CHART - WITH AUR

Serial No	Name	Age	IP NO	Institution	HT	DM	IHD	Volume-CC	DRE	PSA	TUR	syndrome	hematua	Blood transfusion	UTI- post op	sepsis	Re catheterisatio	LUTS	stricture	resurgery	Lenh of stay	PVR	Q max
1	Mr.Annamalai	50	1422033	KMCH	0	0	0	58	2	3.2	0	0	0	0	1	0	1	1	0	0	8	25	18
2	Rajendiran	54	1422160	KMCH	0	0	0	54	2	3.1	0	0	0	0	0	0	0	0	0	0	5	18	19
3	Mr.Srinivasan	58	1422760	KMCH	0	0	0	54	2	3.7	0	0	0	0	1	0	0	0	0	0	8	14	20
4	thulsidoss	68	1422790	KMCH	0	0	0	52	2	3.9	0	0	0	0	0	0	0	0	0	0	7	10	19
5	Mr.Arumugam	65	1422813	KMCH	1	0	1	52	2	3.9	0	0	0	0	0	0	1	0	0	0	6	14	19
6	Mr.Kannaiyan	59	1426510	KMCH	1	1	0	59	2	3.6	0	0	0	0	1	0	1	0	0	0	8	16	19
7	Kuppusamy	53	1426981	KMCH	0	0	0	51	2	2.8	0	0	0	0	0	0	0	0	0	0	5	11	19
8	Mr.Parasuraman	61	1427404	KMCH	0	1	0	53	2	4	0	0	0	0	0	0	0	1	0	0	6	13	21
9	Mr.Loganathan	50	1427638	KMCH	0	0	0	60	2	3.9	0	0	0	0	0	0	1	0	0	0	6	13	22
10	Aanandhan	56	1427712	KMCH	0	0	0	56	2	3.1	0	0	0	0	0	0	0	0	0	0	5	17	18
11	Mr.Varadhan	60	1427715	KMCH	1	1	0	60	2	4.2	0	0	0	0	0	0	0	0	0	0	6	14	19
12	MrJohn Prakash	68	1429124	KMCH	1	1	1	58	2	4	1	1	1	1	1	0	1	0	1	1	10	12	17
13	Kuppannan	61	1429823	KMCH	0	0	0	52	2	3.1	0	0	0	0	0	0	0	0	0	0	7	18	20
14	Mr.Karuppan	63	1435127	KMCH	0	0	0	54	2	3.2	0	0	0	0	0	0	0	1	0	0	7	14	21
15	Mr.Ponnan	67	1435048	KMCH	0	0	0	48	1	3.6	0	0	0	0	0	0	1	0	0	0	6	16	19
16	Ganeshan	59	1435127	KMCH	0	0	0	48	1	2.2	0	0	0	0	0	0	0	0	0	0	7	14	18
17	Mr.Balsubramanian	68	1435978	KMCH	0	0	0	52	2	4.2	0	0	0	0	1	0	0	0	0	0	8	12	20
18	Mr.Raman	59	1436123	KMCH	1	1	0	58	2	3.9	0	0	0	0	0	0	0	1	0	0	6	13	21
19	Sivaraman	67	1436423	KMCH	0	0	0	54	2	3.1	0	0	0	0	0	0	1	0	0	0	7	12	20
20	Mr.Kuppusamy	57	1436823	KMCH	0	0	0	49	2	3.2	0	0	0	0	1	0	0	0	0	0	9	14	21
21	Mr.Chottilal	69	1437270	KMCH	1	1	0	54	2	3.9	0	0	0	0	0	0	1	0	0	0	5	16	19
22	David	65	1437298	KMCH	0	0	0	52	2	2.9	0	0	0	0	0	0	0	0	0	0	7	12	19
23	Mr.Panchatcharam	63	1437328	KMCH	0	1	1	49	2	3.4	0	0	0	0	0	0	0	0	0	0	5	14	18
24	Mr.Rajendiran	65	1437439	KMCH	0	0	0	57	2	3.7	0	0	0	0	0	0	1	0	1	0	8	20	17

56	Mr.Mani	68	25101	GRH	1	1	0	0	60	2	3.9	0	1	0	1	0	0	1	0	0	0	0	0	10	14	18
57	Mr.Subramani	70	25339	GRH	0	0	0	0	52	2	3.4	0	0	0	0	0	0	0	0	0	0	0	0	4	16	17
58	Mr.Govindhan	67	25420	GRH	0	0	0	0	59	2	3.7	0	0	0	0	0	0	1	0	0	0	0	8	15	21	
59	Mr.Vasu	68	25587	GRH	0	0	0	0	54	2	4	0	0	0	1	0	0	0	0	0	0	0	10	21	16	
60	Mr.Kandhasamy	67	25621	GRH	1	1	0	0	54	2	3.8	0	0	0	0	0	0	0	0	0	0	0	6	20	21	
61	Mr.Kanniappan	62	25678	GRH	0	0	0	0	40	1	2.7	0	1	0	0	0	0	1	0	0	0	0	5	13	18	
62	Mr.Ramasamy	65	25879	GRH	1	1	0	0	54	2	3.2	0	0	0	0	0	0	0	0	0	0	0	6	12	18	
63	Mr.Govindaraj	64	26545	GRH	0	0	0	0	56	2	3.7	0	0	0	1	0	0	0	0	0	0	0	9	14	19	
64	Mr.Krishnan	68	26562	GRH	1	1	0	0	51	2	3.1	0	0	0	0	0	0	1	0	0	0	0	8	11	21	
65	Mr.Kannaiyan	57	26421	GRH	0	0	0	0	48	2	3.1	0	0	0	0	0	0	0	0	0	0	0	6	12	20	
66	Mr.Rajendiran	65	26450	GRH	1	1	0	0	58	2	3.2	0	1	1	0	0	0	1	0	0	0	0	8	14	21	
67	Mr.Punniyamoorthy	60	26429	GRH	1	1	0	0	52	2	3.6	0	0	0	1	0	0	1	0	0	0	0	8	17	18	
68	Mr.ramasamy	65	26579	GRH	0	0	0	0	53	2	3.1	0	0	0	0	0	0	1	0	0	0	0	7	15	20	
69	Mr.Kannappan	66	26680	GRH	0	0	0	0	49	2	2.8	0	0	0	0	0	0	0	0	0	0	0	6	10	17	
70	Mr.Ponnusamy	65	26831	GRH	0	0	0	0	48	2	3.3	0	0	0	0	0	0	0	0	0	0	0	6	11	19	
71	Mr.Duraisamy	69	26830	GRH	0	0	0	0	56	2	3.9	0	1	0	1	0	0	1	0	0	0	0	9	14	21	
72	Mr.Thuisidass	68	26859	GRH	0	0	0	0	49	2	3.2	0	0	0	0	0	0	1	0	0	0	0	5	16	21	
73	Mr.Thennavan	58	26987	GRH	0	0	0	0	53	2	3.1	0	0	0	1	0	0	1	0	0	0	0	9	14	20	
74	Rajan	64	27125	GRH	0	0	0	0	52	2	2.4	0	0	0	0	0	0	0	0	0	0	0	8	12	18	

1 - yes

0- No

MASTER CHART - WITH OUT AUR

Sr.NO	Name	Age	IP NO	Hospital	HT	DM	IHD	Volume	DRE	PSA	TUR	syndrome	hematuria	Blood transfusion	Post op UTI	sepsis	Re catheterisation	luts	stricture	Re surgery	Length of stay	PVR	Q max
1	Mr. Velmurugan	55	1425314	KMCH	0	0	0	42	1	3.4	0	0	0	0	0	0	0	0	0	0	4	14	20
2	Mr. Ganesan	69	1425370	KMCH	0	0	0	44	2	3.3	0	0	0	0	0	0	0	0	0	0	5	11	19
3	Mr. Kannappan	50	1423889	KMCH	0	0	0	40	1	2.8	0	0	0	0	0	0	0	0	0	0	4	8	17
4	Mr. Francis	70	1426610	KMCH	0	0	0	43	2	3.3	0	0	0	0	0	0	0	0	0	0	4	9	18
5	MR. Krishnan	66	1426672	KMCH	0	0	0	42	2	3.2	0	0	0	0	0	0	0	0	0	0	4	10	21
6	Mr. Subramani	65	1429398	KMCH	1	1	1	52	2	2.9	0	0	0	0	0	0	0	1	0	0	5	12	22
7	MR. Moorthy	57	1429621	KMCH	0	0	0	38	1	2.2	0	0	0	0	0	0	0	0	0	0	4	15	19
8	Mr. Narayanan	70	1432063	KMCH	0	0	0	40	1	3.3	0	0	0	0	0	0	0	0	0	0	4	12	18
9	Mr. Jeyalal48	48	1431138	KMCH	0	0	0	38	1	2.8	0	0	0	0	0	0	0	1	0	0	4	13	20
10	Mr. Ramesh	55	1433348	KMCH	0	0	0	49	2	3.3	0	0	0	0	0	0	0	0	0	0	5	14	18
11	Mr. Kareem Bai	60	1433550	KMCH	0	0	0	49	2	3.2	0	0	0	0	0	0	0	0	0	0	4	18	17
12	Mr. Ganesh	48	1433647	KMCH	1	0	0	52	2	2.4	0	0	0	0	0	0	0	0	0	0	5	17	19
13	Mr. Sadaiyappan	46	1433521	KMCH	0	1	0	45	2	3.2	0	0	0	0	0	0	0	0	0	0	4	11	18
14	Mr. Krishnamoorthy	54	1433590	KMCH	1	0	0	43	2	3.9	0	0	0	0	0	0	0	1	0	0	5	14	21
15	Mr. Perumal	60	1434156	KMCH	0	0	0	36	1	2.1	0	0	0	0	0	0	0	0	0	0	4	13	22
16	Mr. Ponnuthan	66	1435061	KMCH	0	0	0	40	1	3.2	0	0	0	0	0	0	0	0	0	0	5	15	19
17	Mr. Perumal	61	1437781	KMCH	0	1	0	42	2	2.9	0	0	0	0	0	0	0	0	0	0	4	11	17
18	Mr. Gopalan	62	1437839	KMCH	0	0	1	40	2	3.4	0	0	0	0	0	0	0	0	0	0	5	12	20
19	Mr. Gunalan	58	1438591	KMCH	0	0	0	52	2	2.6	0	0	0	0	0	0	0	1	0	0	4	14	19
20	Mr. Ramachandran	69	1431337	KMCH	0	1	0	40	1	3.5	0	0	0	0	0	0	0	0	0	0	5	12	21
21	Mr. Kannappan	67	1431478	KMCH	0	0	0	48	2	3.2	0	0	0	0	0	0	0	0	0	0	4	20	19
22	Mr. Anandhan	68	1432403	KMCH	0	0	0	45	2	3.2	0	0	0	0	0	0	0	0	0	0	4	16	17
23	Mr. Kuppan	57	1432501	KMCH	0	0	0	46	2	3.9	0	0	0	0	0	0	0	0	0	0	5	13	20
24	Mr. Thangaraj	65	1433811	KMCH	0	0	0	56	2	4	0	0	1	0	0	0	1	0	1	0	6	14	19

25	Mr.Abdul rehman	66	1433980	KMCH	0	0	0	0	38	1	3.1	0	0	0	0	0	0	0	0	0	0	4	12	21
26	Mr.Kasinathan	55	1434076	KMCH	1	0	1	46	2	3.8	0	0	0	0	0	0	0	0	0	0	0	5	12	17
27	Mr.Narayanan	64	1430420	KMCH	1	1	0	43	1	3.3	0	0	0	0	0	0	0	0	0	0	0	5	20	19
28	Mr.Raman	58	1430651	KMCH	0	0	0	48	2	3.1	0	0	0	0	0	0	0	0	0	0	0	5	12	18
29	Mr.Babu	70	13290	GRH	1	0	0	47	2	3.2	0	0	0	0	0	0	0	0	0	0	0	5	15	21
30	Mr.Kannan	60	14580	GRH	0	0	0	50	2	3.9	0	1	0	0	0	0	0	0	0	0	0	6	12	20
31	Mr.Kumaran	58	14671	GRH	0	0	0	48	2	3.2	0	0	0	0	0	0	0	0	0	0	0	5	16	18
32	Mr.Balan	57	14712	GRH	0	0	0	38	1	2.1	0	0	0	0	0	0	0	0	0	0	0	4	12	19
33	Mr.Karunakaran	67	15213	GRH	1	1	0	42	2	3.2	0	0	0	0	0	0	0	0	0	0	0	5	13	20
34	Sivanesan	65	15658	GRH	0	0	0	38	1	2.3	0	0	0	0	0	0	0	0	0	0	0	4	14	19
35	Mr.Srinivasan	65	16529	GRH	0	0	0	46	2	3.5	0	0	0	0	0	0	0	0	0	0	0	5	12	18
36	Mr.Habeeb rehman	65	18016	GRH	1	1	1	47	1	3.3	0	0	0	1	0	0	0	0	0	0	0	7	14	21
37	Mr.Murugesan	53	18593	GRH	0	0	0	54	2	3.9	0	1	1	0	0	0	0	0	0	0	0	6	13	20
38	Mr.Viswanathan	56	18577	GRH	1	0	0	50	2	3.1	0	0	0	0	0	0	0	0	0	0	0	4	13	18
39	Mr.Arokiyam	65	20149	GRH	0	1	0	38	1	2.7	0	0	0	0	0	0	0	0	0	0	0	4	12	21
40	Mr.Gunasekaran	53	21397	GRH	0	0	0	43	2	3.2	0	0	0	0	0	0	0	0	0	0	0	5	16	19
41	Mr.Bhaskaran	64	21924	GRH	0	1	0	50	2	3.8	0	0	0	1	0	0	0	0	0	0	0	7	9	20
42	Mr.Selvaraj	64	21930	GRH	0	0	0	38	1	2.1	0	0	0	0	0	0	0	0	0	0	0	4	11	21
43	Mr.Ramachandran	66	21847	GRH	0	0	0	43	1	3.2	0	0	0	0	0	0	0	0	0	0	0	4	12	19
44	Mr.Nalliah	55	21921	GRH	0	1	1	50	2	3.8	0	0	0	0	0	0	0	0	0	0	0	4	15	18
45	Mr.Ezhumalai	60	22489	GRH	0	0	0	38	1	2.1	0	0	0	0	0	0	0	0	0	0	0	4	14	20
46	Mr.Balasubramanian	60	28320	GRH	0	0	0	47	2	4	0	0	0	0	0	0	0	0	0	0	0	4	12	16
47	Mr.Kannan	57	28378	GRH	0	1	0	38	1	2.2	0	0	0	0	0	0	0	0	0	0	0	4	18	21
48	Mr.Kuberan	69	28397	GRH	1	0	0	43	2	3.2	0	0	0	0	0	0	0	0	0	0	0	4	16	18
49	Mr.Ramakrishanan	69	28342	GRH	0	1	0	55	2	3.7	0	0	0	0	0	0	0	0	0	0	0	4	12	19
50	Mr.Abdul khader	65	28350	GRH	0	0	0	39	1	2.1	0	0	0	0	0	0	0	0	0	0	0	4	11	20
51	Rajendiran	61	28370	GRH	0	0	0	40	1	2.6	0	0	0	0	0	0	0	0	0	0	0	4	13	21
52	Mr.kannan	62	28368	GRH	0	0	0	40	1	2	0	0	0	0	0	0	0	0	0	0	0	4	14	17

1- yes | 0- No

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BY 181214045.MICH IV - UROLOGY SENTHILNATHAN

2 **A COMPARATIVE STUDY OF POST TURP OUTCOME AND COMPLICATIONS BETWEEN BPH PATIENTS PRESENTING WITH OR WITHOUT ACUTE URINARY RETENTION**
Dissertation submitted in partial fulfillment of the requirements of

M.Ch DEGREE EXAMINATION
BRANCH IV - UROLOGY

43 **GOVERNMENT KILPAUK MEDICAL COLLEGE & HOSPITAL**
CHENNAI - 600010



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