"STUDY ON THE EFFICACY OF TAMSULOSIN IN PREVENTION OF POST OPERATIVE URINARY RETENTION IN PATIENTS UNDERGOING HEMORRHOIDECTOMY"

By

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In partial fulfillment of the requirements for the degree of

MASTER OF SURGERY

IN

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Under the Guidance of

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LIST OF ABBREVATION

AUR	:	Acute Urinary Retention
BL	:	Bilateral
BOO	:	Bladder Outlet Obstruction
BPH	:	Benign Prostatic Hyperplasia
C	:	Control
DOS	:	Duration Of Surgery
FDC	:	Fixed-Dose Combination
GA	:	General Anaesthesia
ICS	:	International Continence Society
IV	:	Intra Venous
IPSS	:	International Prostate Symptom Score
IUS	:	Internal Urethral Sphincter
LIS	:	Lateral Internal Sphincterotomy
LAS	:	Lateral Anal Sphincterotomy
LUTS	:	Lower Urinary Tract Symptoms
NT	:	Non Tamsulosin
OAB	:	Over Active Bladder
TOCAS	:	Tamsulosin Oral Controlled Absorption System
POUR	:	Post-Operative Urinary Retention
POF	:	Peri-Operative Fluid
PV	:	Prostate Volume
POUS	:	Pre-Operative Urinary Symptoms

PVR	:	Post Void Residual
SA	:	Spinal Anesthesia
T	:	Tamsulosin
TWOC	:	Trial Without Catheter
TUMT	:	Trans Urethral Microwave Thermotherapy
UTI	:	Urinary Tract Infections
QoL	:	Quality Of Life

ABSTRACT

Background: Among the anorectal surgeries, hemorrhoidectomy procedure most often performed. Following this procedure, urinary retention is the most common complication.

Aim: To prevent postoperative urinary retention (POUR) in patients undergoing hemorrhoidectomy.

Objectives: To administer tamsulosin during pre and post-operative phase in the study group and observe its efficacy in prevention of development of POUR in patients undergoing hemorrhoidectomy. And compare with the non-tamsulosin group.

Methods: In our prospective observational study, 128 patients were reviewed and were divided into study and control group. In the study group, tamsulosin 0.4mg was administered orally 6 hours before surgery and 6 to 12 hours after surgery. Patients were closely followed for 24 hours postoperatively for voiding difficulties.

Results: Each group has 64 patients, in control group 14 cases with POUR required catheterization and in tamsulosin group 4 cases with POUR required catheterization. This difference in requirement of catheterization between two groups was statistically significant.

Conclusion: Use of tamsulosin during Peri-Operative period was found effective in prevention of POUR in patients undergoing hemorrhoidectomy

Keywords: Post-operative urinary retention; Hemorrhoidectomy; Tamsulosin; Catheterization

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INTRODUCTION

INTRODUCTION

Acute urinary retention is a serious and genuine therapeutic condition, requiring emergency intervention to empty the bladder by catheterization. Bladder catheterization is a common and typical methodology performed during major surgery that allows monitoring of urine output, guides volume resuscitation and serves as a surrogate marker of hemodynamic stability. With an expansion in the outpatient number and quick track surgical techniques or fast-track surgical (daycare) procedures, per urethral catheterization is restricted to fewer procedures and for a limited time. [1]

Acute urinary retention is frequently because of BPH but at the same time is a well-known complication following hospital care. Age is a risk factor, as the detrusor contractility diminishes with propelling age, together with the extra irritating element for men that the prostate enlarges with age.[1]

Urinary retention, also called ischuria, is the inability to empty in the presence of a full bladder. It can be caused by deficient bladder contraction and sphincter relaxation and outlet obstruction (such as benign prostatic hyperplasia (BPH) and urethral strictures) or deficient bladder/sphincter coordination.[1]

Acute urinary retention (AUR) is the most widely recognized complication after surgery. Acute urinary retention (AUR) after a surgical intervention is termed as post-operative urinary retention (POUR). Post-operative urinary retention (POUR) is a common and potentially serious morbidity with a revealed incidence of 3 to 25 %.[2]

POUR has generally been defined as the inability to pass urine in the presence of

palpable or percussive bladder after surgery, however, definition shifts broadly. [2]

POUR is seen in patients of both genders and all age groups and following the wide range of surgical procedures however it is more common following surgeries on urinary tract, perineal, gynecological and anorectal procedures. The reason for POUR is dubious however it is by all accounts multifactorial.[2]

Many factors add to the development of POUR. These include the direct effects and impact of anesthetic agents on the bladder, traumatic instrumentation, pelvic dissection, overeager intravenous hydration causing bladder distention, diminished awareness of bladder sensation, increased outlet resistance, immobilization after procedure, post-operative pain (Nociceptive inhibitory reflex), utilization of opiates as analgesia and patient's age and gender.[3,4]

Awareness and recognition of patients at risk of developing postoperative urinary retention (POUR) thus assumes greater significance due to its multifactorial etiology and the absence of uniform characterizing criteria.[4]

Both the wellbeing and financial costs of retention are considerable because it can cause urinary tract infections and requires catheterization, which can, in turn, bring about urethral strictures, prolonged hospital stays, and additional operations. Due to the need for immediate medical attention in order to relieve the severe discomfort, renal insufficiency, catheterization is not often a complicating factor.[5]

Several steps and methodologies have been seen for the prevention of POUR, like restricted perioperative fluid intake, use of parasympathetic and alpha-adrenergic blockers, genuine use of analgesics for pain, sitz bath, use of local anesthesia, ambulation/mobilization have been advocated.[5]

In few clinical studies on alpha-adrenergic blocking agents have been found to have prophylactic and therapeutic potential on POUR. The alpha 1 receptor antagonist acts by decreasing tone in the bladder outlet, thereby reducing outflow resistance and facilitating micturition.[6,7]

Tamsulosin is a drug, belongs to an alpha 1a receptor blocker group. It acts by reducing tone in the bladder neck, thereby reducing the outflow resistance and lessening the development of POUR.

The aim of this comparative prospective study is to investigate the efficacy of Tamsulosin, in the prevention of POUR in post-operative hemorrhoidectomy patients and comparing it with the non-Tamsulosin group.

OBJECTIVES

AIM AND OBJECTIVES

AIM:

- To prevent postoperative urinary retention (POUR) in patients undergoing hemorrhoidectomy.

OBJECTIVES:

- To administer Tamsulosin during pre and post-operative phase in Study groups and observe its efficacy in prevention of incidence of POUR in patients undergoing hemorrhoidectomy.

- To compare with Control group in whom Tamsulosin was not administered.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

ANATOMY OF RECTUM

It is the distal portion of the large gut lies between sigmoid colon above and anal canal below. Rectum begins where taenia coli of sigmoid colon join to forms continues outer longitudinal muscle layer at the level of the sacral promontory[8].

The adult rectum is 12 to 18cm in length and is divided into 3 equal parts. Upper 1/3rd, middle 1/3rd, and lower 1/3rd. Upper 1/3rd peritoneum covers anterior and lateral surface of the rectum. Middle 1/3rd where peritoneum covers only the anterior and part of the lateral surface of the rectum and Lower 1/3rd surrounded by fatty mesorectum and separated from adjacent structures by fascial layers[8].

The lower third of the rectum is separated by a fascial condensation (Denonvilliers' fascia) from the prostate/vagina in front, and behind by another fascial layer (Waldeyer's fascia) from the coccyx and lower two sacral vertebrae. These fascial layers are surgically important as they are a barrier to malignant invasion[8].

ANATOMY OF ANAL CANAL

The anal canal is terminal part of the gastrointestinal tract, begins at the anorectal junction, measures about 4cm in length and terminates in the anal verge. There is the difference in opinion regarding the anatomical and surgical anal canal. The surgical anal canal starts when the rectum passes through the puborectalis and ends at anal verge, whereas anatomical anal canal starts at the dentate or pectinate line and ends at anal verge.

Anal canal derived from two germinal layers, superior 2/3rd from hindgut, i.e. from endoderm and inferior 1/3rd from the ectoderm pit, anal pit or proctodeum. This junction is marked in adults by irregular folding's of the mucosa known as pectinate line or dentate line. This dentate line separates hemorrhoidal vessels into internal and external hemorrhoids[8].

The columnar lining of the rectum extends into the surgical anal canal, which becomes cuboidal as going distally till dentate line, below this there is the abrupt transition into the stratified squamous epithelium. This part of the anal canal lined by squamous epithelium is known as anoderm, this part is different from the anal verge which is also lined by squamous epithelium, as anoderm is thin and shiny and has no epidermal appendages, i.e. sweat glands and hair[8, 9].

Anal canal divided into three parts

a. Upper part – 15mm.

b. Middle part – 15mm.

c. Lower part – 8-10mm.

The anal canal is encircled by the external anal sphincter, internal anal sphincter, conjoint longitudinal muscle, puborectalis muscle and transverse perinea muscle.

Arterial supply:

The superior rectal artery is the direct continuation of the inferior mesenteric artery and is the main arterial supply of the rectum and anal canal above the pectinate line. Middle rectal artery arises on each side from the internal iliac artery and passes to the

rectum in the lateral ligaments and anal canal above the pectinate line. Inferior rectal artery arises on each side from the internal pudendal artery, as it enters the Alcock's canal, it supplies anal canal below the pectinate line[8, 9].

Venous drainage:

The superior hemorrhoidal veins draining the upper half of the anal canal above the dentate line pass upwards to become the rectal veins, these unite to form the superior rectal vein, which later becomes the inferior mesenteric vein. This forms part of the portal venous system and ultimately drains into the splenic vein. Middle rectal veins exist but are small, unimportant channels unless the normal paths are blocked.[8] The lower anal canal and external sphincter drain via the inferior rectal vein, a tributary of pudendal vein finally drains into the internal iliac vein.

Lymphatic drainage of rectum and anal canal:

Upper anal mucosa, internal anal sphincter, and conjoint longitudinal muscle layer drain into the intramural lymphatics of the rectum. The lower anal canal epithelium and external anal sphincter drain downwards via perianal plexus into vessels, which further drain into the external inguinal lymph nodes.[8]

Nerve supply:

Sympathetic nerve supply of anal canal above the pectinate line is from the inferior hypogastric plexus (L1, 2) and the parasympathetic nerve supply is from pelvic splanchnic nerves (S2, 3, 4) pain sensations carried by both. The somatic nerve supply below the pectinate line is from inferior rectal nerves (S2, 3, 4).[8]

HEMORRHOIDS:

Worldwide, in the general population, the prevalence of symptomatic hemorrhoids is accounted to be 4.4%. Patients presenting with the hemorrhoidal disease are more frequently white population, higher socioeconomic status, and rural areas. There is no known sex predilection, although men are more likely to seek treatment. However, pregnancy causes physiologic changes that predispose women to develop symptomatic hemorrhoids. The reason is expanding gravid uterus compresses over the inferior vena cava, causing decreased venous return and distal engorgement of veins[7, 9].

External hemorrhoids occur more commonly in young and middle-aged adults than in older adults. The prevalence of hemorrhoids increases with age, with a peak in persons aged 45-65 years.

Hemorrhoids are not varicosities; they are clusters of vascular tissue (e.g, Arterioles, venules, arteriolar-venular connections), smooth muscle (eg, Treitz muscle), and elastic connective tissue lined by the normal epithelium of the anal canal[8].

Hemorrhoids are exceptionally highly vascular submucosal cushions that for the most part lie along the anal canal in three columns i.e., the left lateral (3 ‘0’ clock), right anterior (11‘0’ clock), and right posterior (7 ‘0’ clock) positions (Figure 3A, 3B). These cushions may be considered sinusoids instead of arteries or veins. These are valveless.[8]

In 1963 Lockhart-Mummery wrote: *'...nearly every lesion around the anus is liable to be called 'piles' by the patient and not infrequently by the referring doctor also.'* Lockhart-Mummery described here that in his time the internal and external hemorrhoids were seen as one diagnosis or easily confused. In 2017 this still appeared to be the case.[9]

This hemorrhoidal tissue fulfills four main functions:

1. The three cushions in the anal canal provide maintenance of anal continence
2. Provide 15%–20% of resting anal pressure
3. Protect the sphincter mechanism during evacuation and
4. Form a compressible lining, facilitating closure of the anal canal.[9]

The smooth muscle acts as a supportive structure, forming a fibro elastic network within the plexuses.[9]

Hemorrhoids are categorized into internal and external hemorrhoids based on their position in relation to the dentate line and anatomic origin within the anal canal.[12]

The exact location of this tissue is in the distal rectum over a trajectory of 2 to 3 centimeters and ends at the dentate line (Figure 1). The dentate line is considered to be both an anatomical and microscopic border marking the transition from mucosa to squamous epithelium. This line is also used to differentiate between internal and external hemorrhoids (Figure 2).[12]

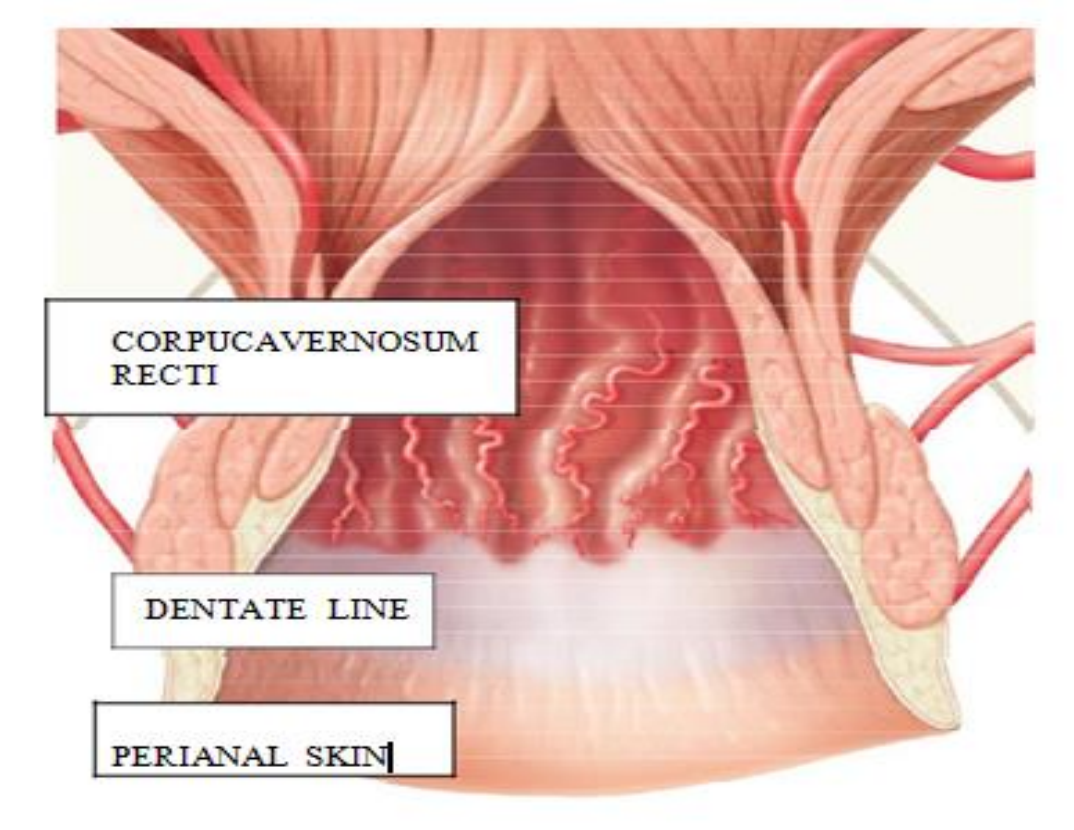


Figure 1: Overview of the distal anal canal with the corpus cavernosum recti indicated

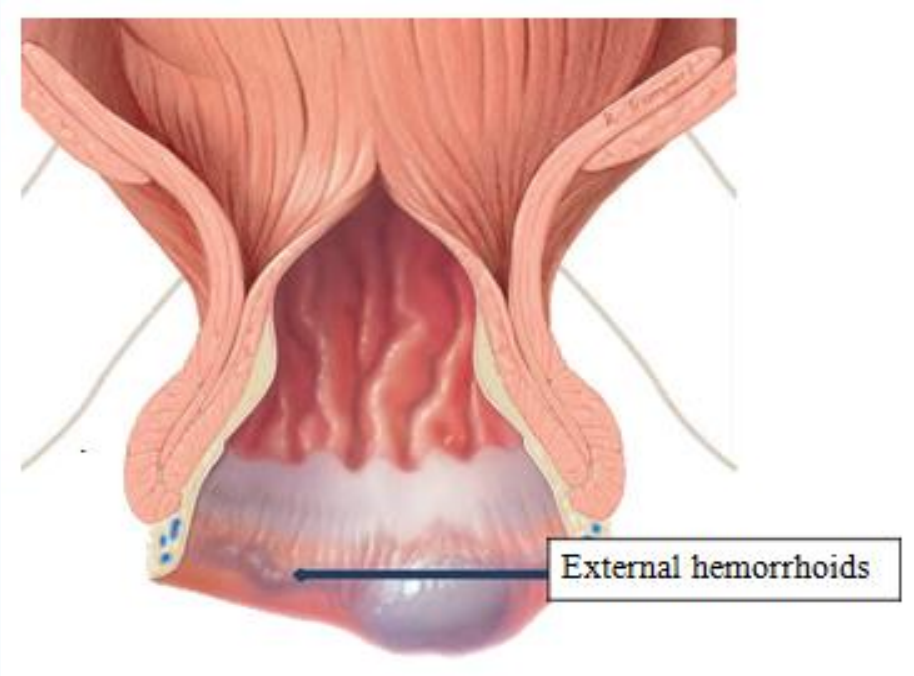


Figure 2: External haemorrhoids

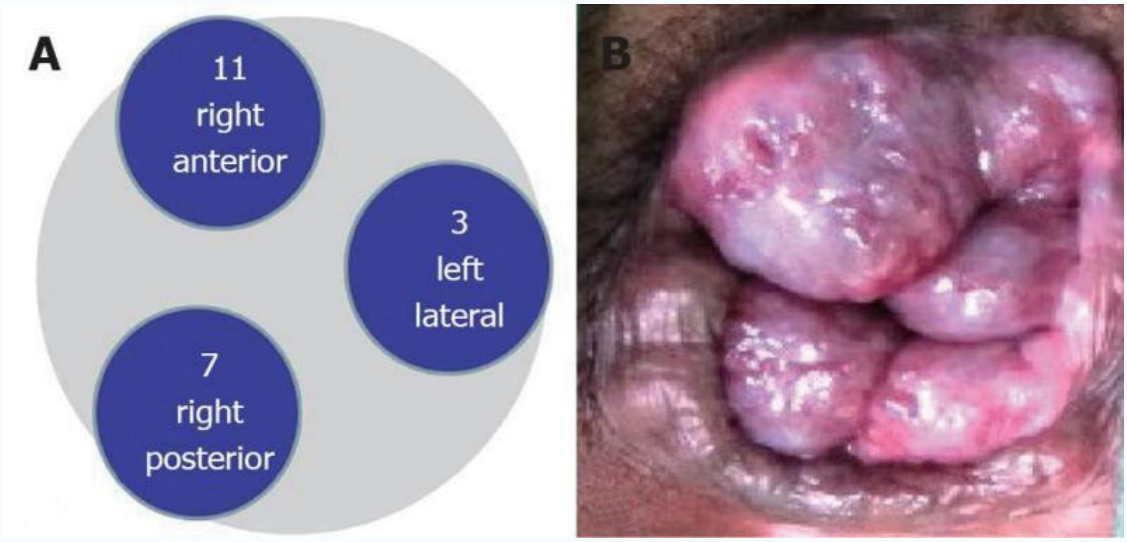


Figure 4A: Internal hemorrhoids with three cushions; **Figure 3B: Internal hemorrhoids**

Table 3.1 Degrees of Hemorrhoids

Degree	Particulars
1st Degree	Painless blood loss, hemorrhoids, visible on proctoscopy,
2nd Degree	Prolapse of hemorrhoids when defecating, spontaneous reduction, blood loss
3rd Degree	Prolapse, spontaneous or when defecating, manual reduction, necessary, blood loss
4th Degree	Permanent prolapse, not reducible, Blood loss

Normal hemorrhoidal tissue accounts for approximately 15-20% of resting anal pressure. Venous drainage of hemorrhoidal tissue is the mirror image of embryologic origin. Internal hemorrhoids drain through the superior rectal vein into the portal system. Rich anastomoses exist between these two and the middle rectal vein, connecting the portal and systemic circulations. Internal hemorrhoids

can be divided into four types according to the classification of Goligher (Table1.1).[12]

MIXED HEMORRHOIDS

These are confluent internal and external hemorrhoids.

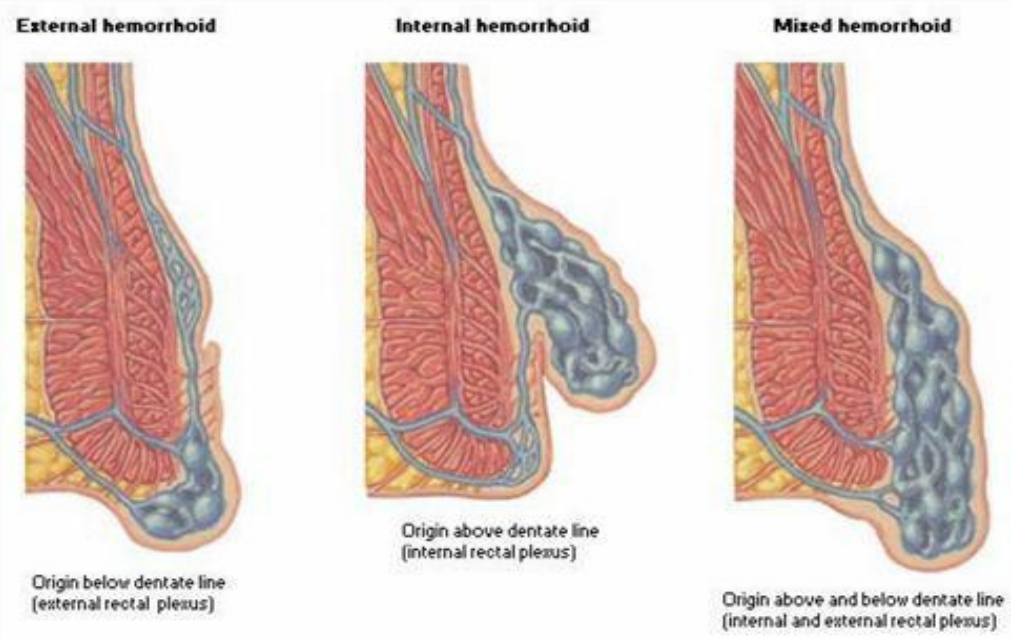


Figure 4: Mixed hemorrhoids

CLINICAL PRESENTATION OF HEMORRHOIDS

Bleeding with or without defecation,

Swelling per rectum,

Mild discomfort or irritation,

Soiling or mucous discharge,

Pruritis,

Difficulties with hygiene, and

Sense of incomplete evacuation.

Internal hemorrhoids are painless and are painful when they are thrombosed, prolapsed with edema, or strangulated. Acute and painful External hemorrhoids become evident when they are thrombosed. Here pain due to rapid stretching of the skin by the clot and surrounding edema. The pain lasts 7-14 days and resolves with the resolution of the thrombosis. With this resolution, the stretched anoderm persists as excess skin or skin tags[11].

HEMORRHOIDECTOMY:

The descriptions of open hemorrhoidectomy are from two centuries ago. The technique was made popular in the United Kingdom by Milligan Morgan in 1937 and is still widely used in Europe. Because of location, technical difficulties or extensive disease with gangrenous hemorrhoidal tissue, an open approach is required. This technique also may be more useful for avoiding subsequent anal stenosis. The operation is done usually under spinal or general anesthesia. In this procedure, hemorrhoidal tissue and vessels involved are excised, including the placement of a suture at the hemorrhoid pedicle, but the incisions are left open[13].

Indications for hemorrhoidectomy: [13]

1. Third degree or fourth-degree hemorrhoids
2. Failure of conservative treatment of second-degree hemorrhoids
3. Fibrosed hemorrhoids due to thrombosis or injection treatment
4. Intero-external hemorrhoids
5. Anaemia

Complications of hemorrhoidectomy: [14, 15]

1. Pain – the severity of pain experienced is patient dependent.
2. Acute retention of urine the risk factors are four or three quadrant excision, more than one operation, older age, intra-operative fluids.
3. Reactionary or secondary hemorrhage
4. Rare complications include- anal stenosis, anal fissure, abscess, fistula in ano, fecal/flatus incontinence

ANATOMY OF URINARY BLADDER

The lower urinary tract comprises of the urinary bladder and the urethra. Urine from the kidneys enters the bladder through the two ureters and exits through the urethra.[10] The urinary bladder is a pyramid-shaped hollow, distensible smooth muscle organ present within the pelvic cavity when empty. As the urinary bladder distends it comes up into the abdominal cavity. It has an apex, a base, a superior surface and two inferio-lateral surfaces. Trigone is a triangular area at the base of the bladder lying between the two ureteral orifices and the internal urethral orifices. In males, trigone overlies median part of the central zone of the prostate. The body of the urinary bladder formed by the detrusor muscle and neck of the bladder is funnel-shaped and has an internal layer of smooth muscle that surrounds the internal meatus of the bladder. The external sphincter is formed collectively by the overlying striated muscle fibers of the pelvic floor.[10]

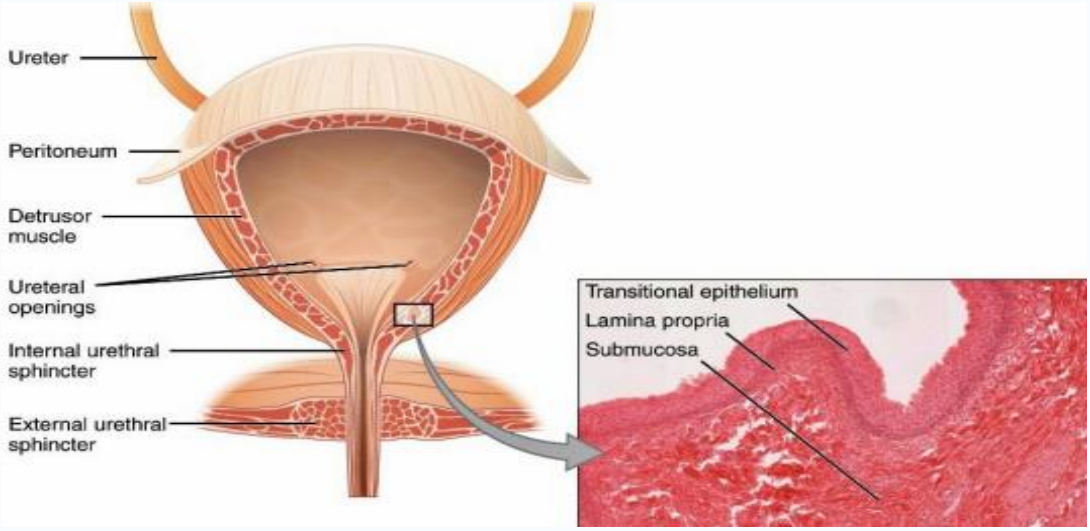


Figure 5: Diagram of anatomy of bladder

The urinary bladder and urethra is lined by versatile transitional epithelial layer (urothelium), act as a protecting layer, and helps in preventing irritating effects of urine over the urinary bladder. The bladder wall (detrusor muscle) composed of interlacing network of three layers of transversely and longitudinally sectioned smooth muscle bundles in a three-dimensional arrangement. The orientation and association between the smooth muscle cells are complex and critical that, as it allows the bladder to adapt according to the demands, as it relaxes and elongates during the filling phase, contract and shorten during the micturition phase. Contraction of these muscles also helps to close the urethral orifice. Both externally and internally they produce a trabeculae appearance.[10]

Blood supply is by the superior and inferior vesical arteries. Veins of the bladder form a plexus that converge on the vesicoprostatic plexus in the groove between bladder and prostate and drain into the iliac veins.[10]

Lymphatics drain into the external and internal iliac groups, mainly to the external iliac nodes.

Nerve supply by sympathetic and parasympathetic fibers form the vesical plexus around the bladder. Parasympathetic fibers derive from the pelvic splanchnic nerves (S2-S4), are the motor to the detrusor muscle and inhibitory to the internal sphincter. Sympathetic fibers derive from T11-L2.[10, 16, 17]

The internal sphincter of urethra located at the bladder's inferior end and the urethra's proximal end at the junction of the urethra with the urinary bladder. The internal sphincter is a continuation of the detrusor muscle and is made of smooth muscle, therefore, it is under involuntary or autonomic control. This is the primary muscle for prohibiting the release of urine.[10, 16, 17]

The female or male external sphincter of the urethra (sphincter urethrae) located at the bladder's distal inferior end in females and inferior to the prostate (at the level of the membranous urethra) in males is a secondary sphincter to control the flow of urine through the urethra. Unlike the internal sphincter muscle, the external sphincter is formed by striated muscle fibers from the pelvic floor and is innervated by the somatic nervous system which allows voluntary control over urination.[10, 17]

MICTURITION PHYSIOLOGY

Nerve supply of urinary bladder:

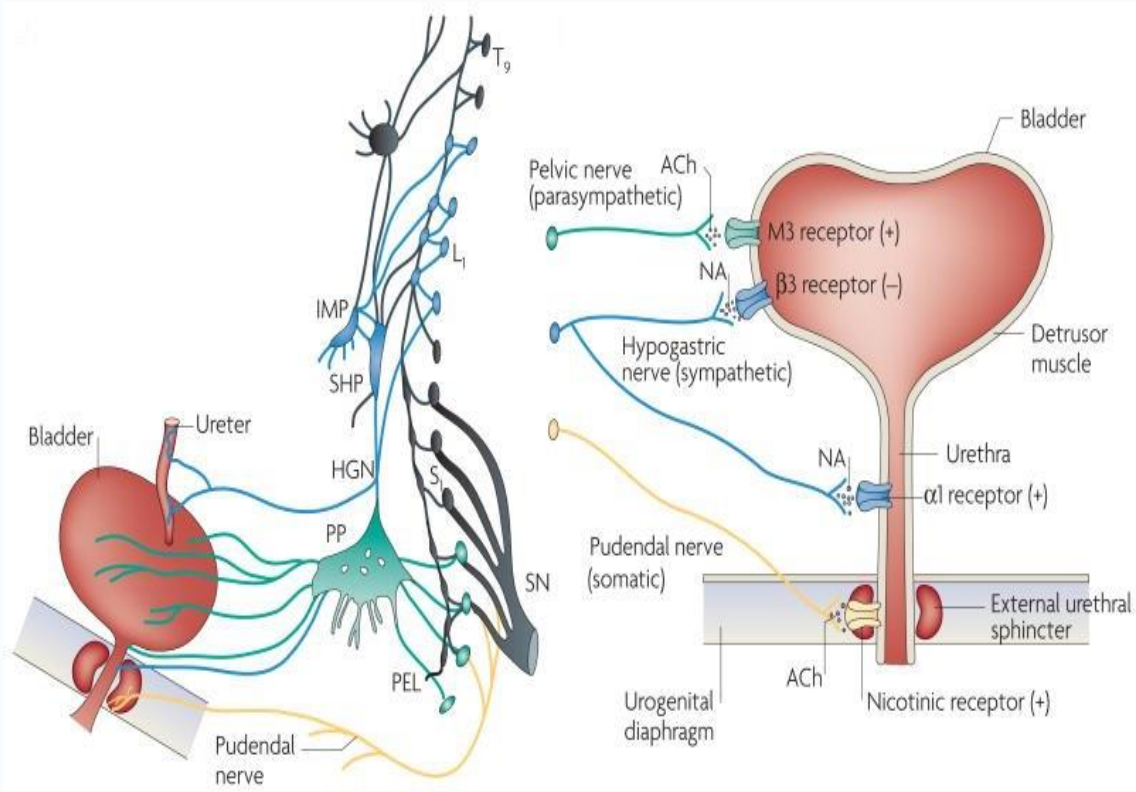


Figure 6: Nerve supply of urinary bladder[17]

The principal nerve supply of the bladder is the *pelvic nerves,* which connect with the spinal cord through the *sacral plexus,* with cord segments S-2 and S-3. Carry both *sensory and motor nerve fibers.* The sensory fibers detect the degree of stretch in the bladder wall. Stretch signals from the posterior urethra are especially strong and are mainly responsible for initiating the reflexes that cause bladder emptying[16, 17].

The motor nerves transmitted in the pelvic nerves are *parasympathetic fibers.* These terminate on ganglion cells located in the wall of the bladder. Short postganglionic nerves then innervate the detrusor muscle (Figure 6)[17].

In addition to the pelvic nerves, two other types of innervation are important in bladder function. Most important are the *skeletal motor fibers* transmitted through the *pudendal nerve* to the external bladder sphincter. These are *somatic nerve fibers* that innervate and control the voluntary skeletal muscle of the sphincter. Also, the bladder receives *sympathetic innervation* from the sympathetic chain through the *hypogastric nerves,* connecting mainly with the L-2 segment of the spinal cord. These sympathetic fibers stimulate mainly the blood vessels and have little to do with bladder contraction. Some sensory nerve fibers also pass by way of the sympathetic nerves and may be important in the sensation of fullness and, in some instances, pain.[16, 17]

The micturition physiology is a standout amongst the most complex procedures in the body, as it involves both the somatic and autonomic (sympathetic and parasympathetic) nervous systems. A great part of the neurogenic regulation of the lower urinary tract is yet obscure and needs to be explored.[16]

Urinary bladder performs two important functions; the storage and emptying of urine. During storage, the bladder pressure stays low because of the high compliant bladder nature, due to sympathetic stimulation, the urethral sphincter and the detrusor muscle is in the state of contracted and relaxed state respectively. When the bladder volume exceeds a certain limit, about l50-300 ml, stretch receptors on the bladder wall start to send signals to the sacral region of the spinal cord. Ascending pathways to the pontine micturition center in the brainstem are activated and, by connection to the frontal cortex, one becomes aware of a full bladder.[16, 17]

Emptying of the bladder (voiding) is initiated by parasympathetic activation, in turn, causing relaxation of the pelvic floor and external urethral sphincter. For emptying of the bladder, a coordinated contraction of the detrusor muscle is required. If micturition is not desired or is inconvenient, micturition is prevented by contraction of the external urethral sphincter and relaxation of the bladder. This voluntary control of micturition is not fully developed until a few years of age.[16, 17]

Neural Reflex Arcs to Control the Bladder Function

The afferent signals from stretch and volume receptors transmit information about bladder filling to centers of the spinal cord and CNS.

Depending on the storage phase, several reflex arcs are activated.[17, 18]

- Spinal pathways
- Pontine micturition center
- Central pathways
- Urethra to bladder reflexes

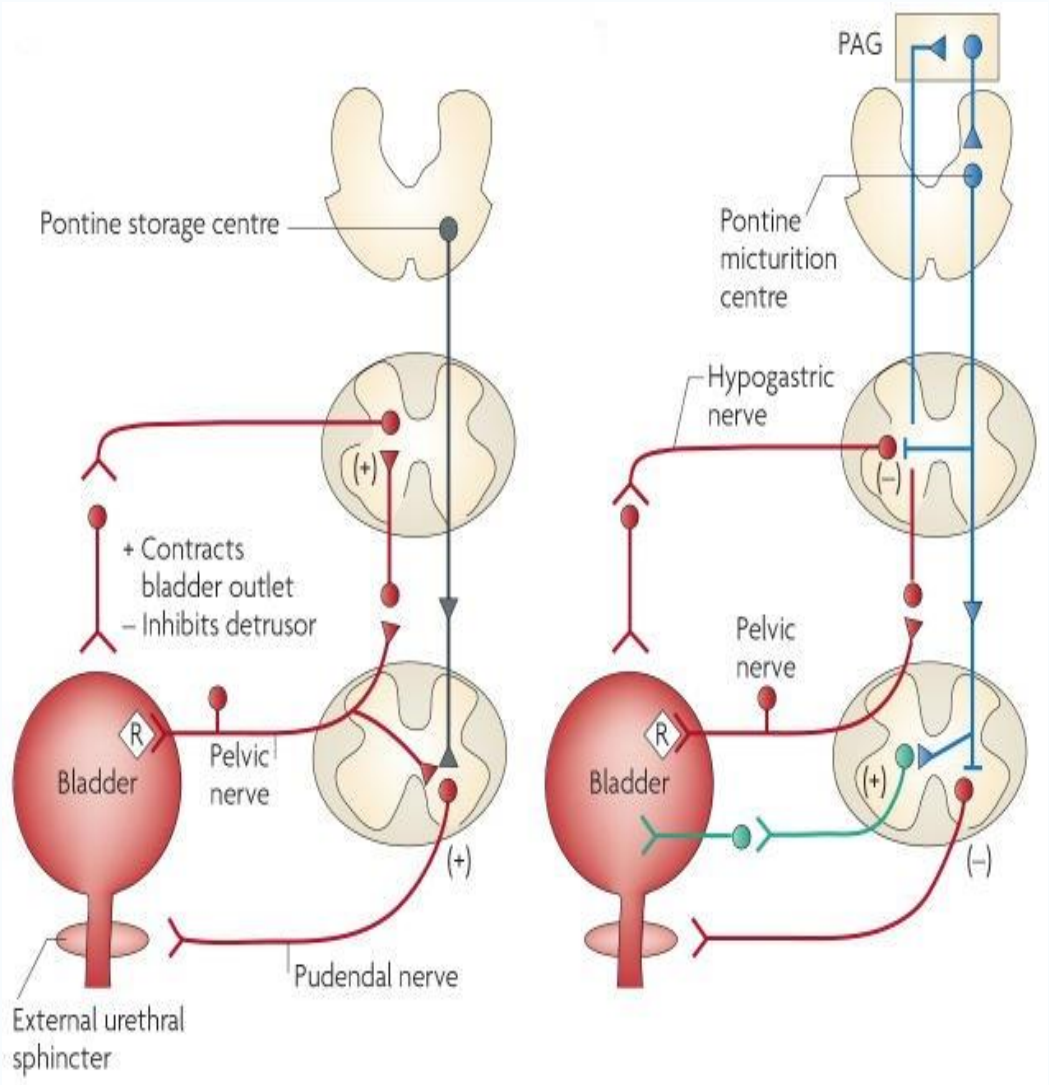


Figure 7: Neural circuits that control continence and micturition[17]

Spinal reflexes:

Inhibit micturition during the filling phase by activating the striated sphincter (pudendal nerve) & inhibiting the detrusor muscle, activating the smooth muscle sphincter via activation of the sympathetic nervous system Spinal pathways.

Afferent signals for the activation of the spinal pathway derive from structures like bladder (increasing bladder filling), pelvic floor muscles, penis, vagina and Rectum. These mechanisms explain the risk of urinary retention after operations in the regions mentioned above.[17, 18]

Pontine Micturition Center

An increasing bladder filling increases the afferent neuronal activity of the bladder; this activates the pontine micturition center in the brainstem (at pons, Barrington's nucleus) which in turn inhibits the spinal reflexes, resulting in activation of the detrusor muscle and inhibition of the urinary sphincter[17].

Central pathways

Central pathways inhibit the micturition reflex. At a certain bladder filling phase, the filling is consciously perceived and afferent signals thus passed on cortical centers. The initiation of micturition is voluntary controlled; the central pathways can inhibit the pontine micturition center over a certain range of the bladder filling[17, 18].

Urethra to bladder reflexes

Urine flow or mechanical stretching of the urethra causes a stimulation of bladder contractions. This reflex has an important function incomplete bladder emptying. The reflex serves as an explanation for the combined urge and stress incontinence in women[18].

LOWER URINARY TRACT SYMPTOMS (LUTS):

Lower urinary tract symptoms (LUTS) are common health problems, highly prevalent among men and women aged > 40 years.[19, 20, 21] According to current research, LUTS is a non-sex specific, non-organ-specific group of symptoms that covers all urinary symptoms.[21] LUTS are defined from the individual's perspective and are according to the International Continence Society (ICS) divided into three groups; storage, voiding and post-micturition symptoms. [22]

Storage symptoms are experienced during the storage phase of the bladder which includes: [21, 22]

- Increased daytime frequency
- Nocturia (the individual has to wake at night one or more times to void)
- Urgency (a sudden compelling desire to pass urine, which is difficult to defer)
- Urinary incontinence

Voiding symptoms are experienced during the voiding phase which includes: [21, 22]

- Slow stream
- Spitting or spraying of the urine stream
- Intermittency (intermittent stream with stops and starts during micturition)
- Hesitancy (difficulty in initiating micturition)
- Straining (muscular effort to either initiate, maintain or improve the urinary stream)
- Terminal dribble (a prolonged final part of the micturition)

Post-micturition symptoms are experienced immediately after micturition: [21, 22]

- Feelings of incomplete emptying
- Post-micturition dribble

URINARY RETENTION:

Urinary retention, also called ischuria, is an inability to void in the presence of a full bladder. It can be caused by the insufficient bladder contraction, insufficient sphincter relaxation, outlet obstruction (such as benign prostatic hyperplasia (BPH) and urethral strictures) or deficient bladder/sphincter coordination. Acute urinary retention is a serious medical condition, requiring emergent actions to empty the bladder by catheterization. Acute urinary retention is often due to BPH but is also a well-known complication following hospital care. Age is a risk factor, as the detrusor contractility decreases with advancing age, together with the additional aggravating factor for men that the prostate enlarges with age.[1]

There are several other risk factors that may inhibit voiding in the hospitalized patient.[3, 4, 18, 87]

- Bed rest: It affects the voiding negatively, but the reason for this is unclear.
- Lack of privacy: Many people have difficulty voiding where other people are in close proximity, as is often the case in hospitals.
- Pain, anxiety, and stress: It increases sympathetic stimulation; relaxing the bladder and contracting the sphincter.
- Drugs: Many medications interfere with bladder function. Opioids decrease detrusor tone, decrease the bladder sensation (urge to void) and inhibit the voiding reflex. The peripheral mechanism may also play a role in opioid-induced bladder dysfunction.[14] Anticholinergics such as atropine block detrusor contractions and cause bladder hypotonic. Sympathomimetics, such as epinephrine, relax the bladder and inhibit voiding.
- Anaesthesia: It affects micturition in several ways. General anesthetics cause bladder atony by interfering with the autonomic regulation of detrusor tone.

Sedative-hypnotics and volatile anesthetics suppress detrusor contraction and the micturition reflex. Spinal and epidural local anesthetics blocks detrusor contraction and bladder sensation.

- Intravenous fluids: Excessive infusion of intravenous fluids can lead to a rapid and large urine production and subsequent over-distension of the bladder.

Surgical, orthopedic and obstetrical patients are exposed to many of those factors and are at particularly high risk of urinary retention, but almost all patients admitted to hospital care are at risk. Lack of privacy, anxiety, pain, and opiates are examples of risk factors prevalent in both medical and surgical wards. Tubes, drains and intravenous lines prevent mobility and restrict visits to the bathroom. Urinary retention is also common among patients admitted for rehabilitation; Wu & Baguley found an incidence of 21.5% at a general rehabilitation unit.[24]

POSTOPERATIVE URINARY RETENTION:

When urinary retention occurs after surgery, it is called postoperative urinary retention (POUR). The incidence of POUR reported in different studies varies widely, generally ranging from 4% to 25%, but reports up to 70%.[25] Lack of uniform defining criteria and differences in patient characteristics can explain the varying results. In some studies, 400 ml have been the cut-off limit for defining a full bladder, while other studies have used 500 ml and 600ml respectively. The length of the postoperative period studied also varies from a few hours after surgery to several days during the postsurgical hospitalization period.

Why is Postoperative Urinary Retention an Issue?

While postoperative urinary retention may not usually be a life-threatening issue, it is something to be concerned about, it does require prompt assessment and treatment and it is very uncomfortable for the patient.[32] one consequence of urinary retention is bladder distension. According to McConnell, "distension from more than 1,000 ml or more can cause loss of bladder tone-requiring weeks or months for recovery". As well, according to McConnell, this loss of bladder tone could be permanent. [33]

Joelsson-Alm et al[34]. Summarize well what happens when bladder over distention occurs: The normal bladder volume is 400-500 ml. The optimum ability to empty the bladder lies at an approximate volume of 300ml, after which voiding becomes more difficult as the volume increases. When the bladder volume exceeds 500 ml there is a clear risk of overstretching of the muscle fibers in the bladder wall, which can result in motility problems with subsequent atonia, post-void residual volumes, and urinary tract infections.[34]

An increase in bladder residual volumes places patients at a greater risk for urinary tract infections (UTI's). UTI's can be caused by retention due to urine stasis.

FACTORS ASSOCIATED WITH POUR:

There are many and varied reasons postulated for why POUR occurs. As with the definition of POUR, there are differing opinions and study results that support or refute a particular variable's involvement in the development of urinary retention after surgery.

AGE:

Increasing age is a key risk factor for developing POUR and Sarasin et al.[35] found that increasing age (>70 years old) was a significant risk factor for developing POUR. Lamonerie et al. [36] found persons over the age of 60 were at an increased risk of POUR, while Keita et al. [37] identified persons aged 50 or more. In contrast, some researchers did not find that increasing age was a risk factor.[25]

GENDER:

Many studies have identified male gender as being a risk factor for developing urinary retention after surgery. [35,38] Lingaraj et al.[39] postulated that male gender came out as a factor due to the rates of benign prostate hypertrophy and urethral stricture in males. In obstructive urinary retention, the most common reason is benign prostatic hyperplasia (BPH). In contrast, many studies reviewed and found that the gender did not predispose patients to POUR. As with age, many researchers were surprised that male gender did not come out in their studies as a predisposing factor, but did not discuss why that may have happened. [34, 40]

ANESTHESIA:

The studies have been done in comparing general anesthesia with spinal anesthesia when looking for causes of POUR. In some of the studies, it has been reported that risk of POUR is increased due to the spinal anesthesia, whereas in some of the studies it has been mentioned that, the risk of POUR is due to the fact of general anesthesia. Finally, it has been concluded from some of the studies that, the type of anesthesia is not a factor at all in contributing the urinary retention.[40]

DURATION OF SURGERY:

As with other studied factors related to POUR, some of the researchers found that duration of surgery contributed to POUR, others did not. The increased length of surgery was found to be a factor in many studies. Keita et al.[34] specified duration of surgery greater than 60 minutes (a factor significant in the univariate analysis, but not the multivariate analysis) and Lamonerie et al.[36] stated duration greater than 120 minutes contributed to POUR. Increasing duration of surgery has been linked to POUR possibly due to the fact that most patients receive more intravenous fluids and larger amounts of opioids. Lau and Lam [41], and Warner et al.[42] did not find that the length of surgery is a contributing factor to POUR.

POSTOPERATIVE ANALGESIA:

Postoperative analgesics have been identified as increasing one's risk of developing POUR; both the types of analgesics and the ways in which those analgesics are delivered to the patient. Morphine is a commonly used narcotic postoperatively. Urinary retention and hesitancy are known side effects of morphine administration.[43]

Tammela[44] postulated that the reason that morphine (given parenteral or extradural), contributes to POUR is that it causes "analgesia and inhibition of the voiding reflex", as well as impairing bladder sensation. Epidural analgesia postoperatively has been commonly implicated as a risk factor for POUR review.[39] They found that "the highest rates of opioid-mediated urinary retention have generally been associated with epidural administration.[45]

OTHER DRUGS:

There have been various non-opioid drugs studied in relation to POUR. Atropine (an anticholinergic), is used during general anesthesia (GA) and "blocks the muscarinic receptors of the urinary bladder paralyzing the detrusor.[44]

Therefore, those who undergo GA and receive atropine are at greater risk of developing POUR. However, in the two orthopedic studies that included atropine or atropine-like drugs, it was found not to be a factor.[40]

The contribution of beta-blockers has also been explored as a risk factor with POUR. Boulis et al.[46] found that preoperative beta-blockers increased the incidence of POUR, but Ringdal et al.[47] did not.

INTRAVENOUS FLUIDS:

Several studies have identified the amount of intravenous (IV) fluids given perioperatively as a risk factor for developing POUR. [32] Feliciano et al.[32] (in their univariate analysis) and Keita et al. (in their multivariate analysis) found that greater than 750 ml of intraoperative fluids contributed to POUR, whereas Ringdal et al.[47] found the amount to be greater than 1000 ml. According to Darrah et al.[45], "high fluid volumes are thought to cause retention via overdistention of the bladder wall.

Some studies that looked at IV fluids did not identify it as a factor. They stated the following: "fluid administration is complex because it requires a design that takes into consideration the infusion rate rather than the total amount of fluid infused as well as the pathophysiology of postsurgical micturition and the dynamic function of the bladder.[48]

HISTORY OF BLADDER/PROSTATE PROBLEMS:

A history of bladder and/or prostate problems had been identified as a possible factor for POUR, although the evidence is inconclusive. Kumar et al.[51] and Ringdal et al.[47] found a urological history to positively correlate with POUR (although in Kumar et al.'s study it was only a weak predictor). Keita et al.[37] and O'Riordan et al. [52] (2000) did not find an association between a urological history and POUR.

BLADDER VOLUME IN THE RECOVERY ROOM:

With the introduction of portable bladder scanners, research surrounding POUR has begun looking at the assessment of bladder volumes. Thus, some studies have found that the amount of urine in the bladder, when scanned in the postoperative recovery room, can be a contributing factor to POUR. Shadle et al.[49] found bladder volume on entry to the recovery room added to the risk of POUR. Feliciano et al. also found this, but specified a bladder volume greater than 500 ml, Dal Mago, Helayel, Bianchini, Kozuki and de Oliveira Filho[50] specified greater than or equal to 360 ml and Keita et al.[37] specified a bladder volume greater than 270 ml. Keita et al. concluded that their findings firmly support scanning the bladders of nearly all patients who come into the post anesthetic care unit.

TYPE OF SURGERY:

The literature identifies patients undergoing certain types of surgeries as being at higher risk of POUR (gynecological, urological, anorectal). Major orthopedic surgery, in particular, has been identified as predisposing patients with POUR.[35]

HISTORY OF RENAL DISEASE:

One study by Dutta[53] looked at the history of renal disease and pre-operative creatinine lab results in relation to POUR among orthopedic patients. The study found that those with a history of renal disease and those with elevated creatinine were highly likely to develop POUR. However, as the author notes in his limitations, this was a small sample (50 patients) and the results are difficult to generalize. This does not stop Dutta however, from recommending that those with a history of renal disease or with an elevated creatinine be catheterized preoperatively.[53]

ABILITY TO VOID SUPINE:

Similar to the study conducted by Waterhouse, Beaumont, Murray, Staniforth and Stone[54] in 1987, Weekes et al.[55] looked at a man's ability to urinate while laying down as a predictive factor for POUR. In contrast to Waterhouse et al.[54] study though, Weekes et al[55]. did not find that an inability to void while lying down was predictive of the need to be catheterized after surgery.

COMORBIDITIES:

Studies have identified factors other than a history of prostate/bladder problems as contributing to POUR. Izard et al.[56] found that there was a trend for patients with a significant history of hypertension to have higher rates of urinary retention, although this was not found to be statistically significant. Diabetes has also been looked at as a factor related to POUR. Izard et al. identified a trend (non-significant) for diabetics to have a higher rate of urinary tract infections postoperatively. There was no difference in POUR rates among diabetics. Olsen and Nielsen[40] also studied diabetes and found that it was a risk factor for POUR, with 45% of the diabetics in the study being

diagnosed. Darrah et al.[45] say this in regards to POUR and diabetes: "impaired baseline bladders sensation may augment the contribution that decreased afferent activity secondary to anesthetics, sedative-hypnotics, and analgesics makes to the development of retention".

Other researchers have found that patients comorbidities, in general, did not contribute to POUR. Like IV fluids, past medical history is a bit of a complicated issue. [51, 57]

DIAGNOSIS OF POUR:

Three methods have been used to diagnose POUR: history and physical examination, the need for bladder catheterization, and, more recently, ultrasonographic assessment.

CLINICAL EXAMINATION:

Pain and discomfort in the lower part of the abdomen have been used as conventional indicators for POUR. However, these symptoms may be masked by regional anesthesia, comorbidities including patients with spinal cord injury or stroke or sedated patients who are unable to effectively communicate their symptoms.[58]

Clinical assessment by palpation and percussion in the suprapubic area is another commonly used method for diagnosis of POUR. This method, however, lacks the sensitivity to provide an accurate measure of the residual urinary volume. Percussive bladder to the level of the umbilicus provides an approximate estimate of urine at least of 500 ml, but if the percussible bladder extending above the umbilicus the volume of urine can vary as much as 1,000 ml.

Deep palpation of the bladder is not recommended as it produces significant discomfort and may elicit vagal reflexes evoked by pain. In addition, when compared to ultrasound, clinical assessment has been found to overestimate the bladder volume.[58]

BLADDER CATHETERIZATION:

Bladder catheterization is used both as a diagnostic tool and as the treatment for POUR. The inability to void in the postoperative period could be multifactorial, including inadequate perioperative fluids. It is imperative to evaluate and treat the underlying cause before making the diagnosis of POUR and proceeding with catheterization.[59]

Catheterization is an invasive procedure with the potential to cause complications, including catheter-related infections, urethral trauma, prostatitis, and patient discomfort.[59]

ULTRASOUND ASSESSMENT:

Although ultrasound used as an imaging modality to evaluate bladder function, its use in the perioperative period as a diagnostic tool for POUR has gained popularity only in the past decade. [61-67] several studies have shown good correlation between the volumes measured by bladder catheterization and by ultrasound; [59, 67] in women, however, ultrasound can slightly underestimate bladder volume. When ultrasound is performed by the same individual, the difference between urinary volume measured by the ultrasound and by catheterization varies minimally, indicating the need for operator consistency.[67]

ADVERSE EFFECTS ASSOCIATED WITH POUR

Autonomic Response:

Painful stimulation resulting from an overdistended bladder can cause vomiting, bradycardia, hypotension, hypertension, cardiac dysrhythmias, or even asystole. POUR has been shown to prolong hospital stay in patients undergoing elective cholecystectomy and increase the discharge time in 19% of outpatients.[69, 70]

Infection:

Urinary infection can be a direct complication of persistent POUR (the consequence of bladder hypotonia and the inability to completely empty the bladder) or an indirect complication of bladder catheterization.[71] Higher mortality rate has been reported in hospitalized patients who developed nosocomial urinary tract infection after indwelling bladder catheterization.[72] The incidence of bacteremia after single catheterization has been reported to be as high as 8%.[72]

Bladder Over distension and Adverse Effects on Urodynamics:

Bladder over distension is a potentially serious adverse effect associated with POUR, and it has a reported incidence of 44%.[74] In a study by Pavlin *et al.*, 20.5% of outpatients had a bladder volume greater than 500 ml.[69] Martinez OV et al[7l]. set up a target volume of 400 ml in a study of outpatients undergoing ambulatory surgery under spinal and epidural anesthesia. It is thus logical to investigate further and establish safe bladder volume ranges to avoid bladder overdistention and persistent bladder dysfunction.

CLINICAL MANAGEMENT OF POUR:

Prevention of POUR requires the identification of patients with perioperative risk factors. Pharmacological strategies have been used as an attempt to prevent or to treat persistent POUR. Systemic phentolamine has been shown to decrease the resistance of IUS in rats,[75] whereas phenoxybenzamine reduces the time to first void and the incidence of bladder catheterization.[76] In a prospective randomized study, Goldman *et al.* showed that phenoxybenzamine was effective in preventing and treating POUR in patients undergoing inguinal hernioplasty.[24]

Bladder Catheterization:

Bladder catheterization is the standard treatment of POUR. Although in-out and indwelling urinary catheterization remain the standard therapy to treat POUR, it is not known which patients require catheterization, and the duration of catheterization and bladder volume thresholds are also unknown.[55]

PREVENTION OF POUR:

One study has looked at prevention of POUR with naloxone. Gallo et al. found that "patients who received postoperative intermittent low-dose intravenous naloxone voided more frequently, had lower bladder scan residuals, and were catheterized less often than patients who did not receive naloxone". They go on to suggest that the addition of low-dose naloxone to the postoperative analgesic protocol could prevent urinary retention, which would decrease complications and help the patient move along the road to recovery a little faster.[77]

A study conducted by Ali Hamidi Madani et al[78] showed that POUR in patients who received tamsulosin was significantly lower than placebo, as 5.9% of the patients treated with tamsulosin and 21.1% placebo group, reported urinary retention following surgery.

TAMSULOSIN:

Tamsulosin is a α_{1a} adrenergic receptor antagonist used in the symptomatic treatment of benign prostatic hyperplasia (BPH). Tamsulosin was developed by Yamanouchi pharmaceuticals and was first marketed in 1996 as Flomax, and also under the name Omnic.[79]

Tamsulosin has 100% bioavailability and half-life of 9 to 13 hours. Extensively metabolized in the liver. 76% excretes through urine. Tamsulosin exhibits high plasma protein binding, largely to alpha (1)- acid glycoprotein. It is metabolized mainly by cytochrome P450 (CYP) 3A4 and CYP 2D6 to compounds with low abundance and 7-15% of an oral dose is excreted through renal as the parent compound. Age does not affect the pharmacokinetics of tamsulosin and increases the concentration of alpha (1)- acid glycoprotein leads to pharmacokinetics alterations in renal impaired patients. Tamsulosin is used in the treatment of difficult urination, a common symptom of the enlarged prostate. Tamsulosin and other medications in the class called alpha blockers, work by relaxing bladder neck muscles and muscle fibers in the prostate itself and make it easier to urinate. [79]

MECHANISM OF ACTION:

Tamsulosin is a selective α_1 receptor antagonist that has preferential selectivity for the α_{1A} receptor in the prostate versus the α_{1B}receptor in the blood vessels. When alpha 1A receptors in the bladder neck and the prostate are blocked, this causes a relaxation of smooth muscle and therefore less resistance to urinary flow. Selective action of tamsulosin in alpha 1A/D receptors is controversial and over three-quarters of tamsulosin registered human studies are unpublished. [80]

USES: [81, 82]

- Tamsulosin is mainly used in benign prostatic hyperplasia,
- It can be used in the condition like distal ureteric calculi for its passage by smooth muscle relaxation via alpha receptor antagonism.
- Tamsulosin is also used as the treatment of acute urinary retention.

ADVERSE EFFECTS: [83, 84]

- Immunologic: Higher risk of allergic reaction in those with sulfa allergies.
- Ophthalmologic: during cataract surgery, patients, who are undergoing treatment with tamsulosin, are more prone to develop a complication known as floppy iris syndrome.
- Postural hypotension, fainting, dizziness, vertigo, nasal congestion. The rate of hypotensive events was higher among tamsulosin users (42 events per 10,000 person-years). A significantly elevated risk for severe hypotension after starting tamsulosin was evident during weeks 1 to 4 (rate ratio, 2.1) and weeks 5 to 8 (RR, 1.5) but not during weeks 9 to 12. Findings were similar among men who restarted tamsulosin after they had stopped it, and risk for hypotension was

slightly elevated during maintenance treatment (RR, 1.2)[83].

- Tamsulosin affects sexual function in men. i.e., it causes retrograde ejaculation.

The various studies to show the preventive effect of Tamsulosin on postoperative urinary retention in men as follows:

Ali Hamidi Madani et al[78] showed that, POUR in patients who received tamsulosin was significantly lower than placebo, as 5.9% of the patients treated with tamsulosin and 21.1% placebo group, reported urinary retention following surgery (p=0.001), No serious adverse effects were seen in both groups and concluded that short perioperative treatment with tamsulosin can reduce the incidence of urinary retention and need for catheterization after varicocelectomy, inguinal herniorrhaphy, and scrotal surgery.

Mohammadi Fallah et al[5] showed that the POUR rate after inguinal herniorrhaphy among patients who received Tamsulosin was significantly lower than those who received placebo(2.5 versus 15%).There were 40 patients in group one (control group) and 40 patients in group two (Tamsulosin group). The patients' mean age was 64 years. In group one, 6 patients and in group two, 1 patient required catheterization. Thus, 15% of patients in group I and 2.5% of patients in group II had urinary retention. The difference in the requirement for catheterization was statistically significant (p=0.04). The technique of herniorrhaphy, the side of the body in which a hernia was located, the type of anesthesia, the duration of the surgery, and the severity of pre-operative urinary symptoms had no significant effect on the incidence of urinary retention and concluded that the use of perioperative Tamsulosin represents an effective strategy to reduce the risk of post-operative urinary retention following inguinal herniorrhaphy.[5]

Jeong IG et al[82] examined the impact of tamsulosin on the rate of acute urinary retention following early catheter removal after robot-assisted laparoscopic radical prostatectomy. In this randomized study a total of 236 patients with prostate cancer, who underwent robot-assisted laparoscopic radical prostatectomy, carried out by a single surgeon were enrolled. Patients were divided into two groups randomly and were treated with tamsulosin (0.4 mg) from 1 day before to 14 days after surgery (tamsulosin group), or no tamsulosin treatment (control group). On the fifth postoperative day, the urethral catheter was removed. The primary end-point was the acute urinary retention rate. Changes in each domain of the International Continence Society male short-form questionnaire and uroflowmetry parameters were secondary end-points. The primary end-point was assessed in 218 patients (92.4%; n = 109 in each group). It was not assessed in 18 patients because of the cystographic leak from the vesicourethral anastomosis. The acute urinary retention rate was lower in the tamsulosin group (7.3%) than in the control group (17.4%, P = 0.018). Multivariate logistic regression analysis found that tamsulosin treatment and the operative experience of the surgeon, as independent risk factors for acute urinary retention. Tamsulosin-treated patients had a 0.30-fold lower risk of developing acute urinary retention compared with control patients (95% confidence interval 0.12-0.76; P = 0.011). None of the International Continence Society male questionnaire domain scores showed significant changes between the groups. Perioperative treatment with tamsulosin in patients undergoing robot-assisted laparoscopic radical prostatectomy reduces the incidence of acute urinary retention after removal of the catheter at earliest, without aggravating urinary incontinence.

Ahmad MM et al[85] showed that among 626 patients who underwent surgery for the benign anorectal condition were included in the study and grouped into two groups with 313 patients in each group, control, and case group. In the control group, 56 patients (17.9%) had the inability to pass urine and required catheterization and in the case group, only eight patients (2.5%) needed catheterization following POUR. The difference in the requirement of catheterization following POUR was statistically significant (P =0.04) and concluded that the use of tamsulosin in preoperative and postoperative period has been shown effective to decrease the incidence of POUR following surgeries for benign anorectal pathologies.

Goldman et al1[6] performed a randomized, placebo-controlled trial to determine the role of alpha-blockers in reducing the risk of POUR after hernioplasty. The study included 102 men older than 60 years who were randomly assigned to receive phenoxybenzamine or a control. POUR developed in 26% of men in the control group and 0% of men who received phenoxybenzamine.

Djavan et al[86] reported a randomized study evaluating neoadjuvant and adjuvant alpha-blockade as a strategy to decrease the risk of acute urinary retention following transurethral microwave thermotherapy (TUMT). In that study, 41 men with benign prostatic hyperplasia underwent TUMT with neoadjuvant and adjuvant tamsulosin therapy (0.4 mg daily) and 40 men underwent TUMT alone. Urinary retention was observed in 12% of the TUMT-alone group and 2% of the tamsulosin-treated group. The use of neoadjuvant and adjuvant tamsulosin represents an effective strategy to reduce the risk of catheter dependency following TUMT and provides immediate symptom relief.

Toyonaga et al[87] showed that female sex, preoperative urinary symptoms, diabetes mellitus, large amounts of intravenous fluid administered perioperatively, and postoperative pain are independent risk factors for urinary retention in selected cases of anorectal surgery such as hemorrhoidectomy and fistulectomy.

Petros et al[88] retrospectively reviewed 295 inguinal herniorrhaphies in men. They found age less than 53 years, spinal anesthesia, and perioperative fluids less than 1,200 ml all significantly reduced the incidence of POUR.

Jensen et al[89] recently reported a Medline-based search intended to determine the incidence of POUR following herniorrhaphy. The incidences of POUR following inguinal herniorrhaphies performed under local anesthesia, regional anesthesia, and general anesthesia were 0.37%, 2.4%, and 3.0%, respectively. The investigators concluded that the type of anesthesia significantly influenced the risk of POUR.

Patel *et al* [90] investigated the potential efficacy of alpha-blockers for facilitating early removal of the urinary catheter following radical prostatectomy.

Singh I et al[91] studied the safety and efficacy of 'tamsulosin and darifenacin' (TD) vs. tamsulosin and placebo' (TP) in patients with symptomatic benign prostate hyperplasia (BPH) with associated overactive bladder (OAB) symptoms. In this study patients with symptomatic BPH with the OAB symptoms like, mean change in frequency, incontinence, nocturnal frequency/24 hour and IPSS (International prostate symptom score) were (-4.83 vs. -3.93, p=0.023), (-1.50 vs. 1.08, p=0.001), (-2.20 vs. -1.87, p<0.001) and (-7.90 vs. -6.27, p<0.001) included in the TD/TP group

respectively (significant). Apart from some minor side effects (12 vs. 9), all interventions appeared to be safe and well tolerated. The mean change in the PVR (Postvoid residual) was marginal (+10.84ml and -16.93) and the incidence of urinary retention was 13% and 3% in the TD and TP groups respectively (p=0.35). Treatment with tamsulosin and darifenacin for 8 weeks is an effective and safe treatment modality in select patients of BPH with accompanying OAB symptoms. Davidov MI et al[92] reported results of an 8-year study estimating the risk of acute urinary retention in patients with stage I prostatic adenoma. Patients were randomly assigned into two groups. The first group consists of 331 men who were taking Omnic (tamsulosin) 0.4 mg 1 time daily and regularly for 8 years as a means of medical therapy. The second group consists of 334 patients were treated with herbal preparations (Gentoos, Tadenan or Speman). Patients with acute retention of urine were taken to the urological department to drain urine from the urinary bladder by means of catheterization or by the surgical procedure. The incidence of acute urinary retention in group 1 ranged from 0.3 to 1.2% per year and, for a total of 8 years of follow-up was 6.45%. In the second group, it ranged from 1.8 to 7.3% per year, making a total of 36.2%. Therefore, the risk of acute urinary retention in patients receiving Omnic (tamsulosin) was reduced by 5.6 times in comparison with the group of patients treated with herbal medications. Thus, the need for surgery decreased from 27.8 to 6.3%. According to the results of an 8-year long tamsulosin was found as a safe and highly effective means to reduce the risk of acute urinary retention.

Gong M et al[93] studied on tamsulosin and solifenacin combined therapy compared with tamsulosin monotherapy for male lower urinary tract symptoms (LUTS). Authors have evaluated safety and efficacy of tamsulosin and solifenacin drugs.

Synthetic data showed combination therapy had significant improvements in Storage International Prostate Symptom Score. The incidence of adverse effects in the tamsulosin and solifenacin combined therapy group (30.82%) was similar to the tamsulosin monotherapy group (25.75%). Acute urinary retention was seldom reported in the studies and no clinically significant changes regarding Qmax were showed in our meta-analysis. Tamsulosin and solifenacin combined therapy may be a reasonable and appropriate option for male LUTS patients, especially for those who have significant storage symptoms.

Poylin V et al[94] aimed to investigate the potential benefits of rates of urinary retention in men undergoing pelvic surgery. This is a retrospective review of an institutional colorectal database. In this study, all men undergoing pelvic surgery were included. The study was done between 2004 and 2013. Patients given 0.4 mg of tamsulosin 3 days prior and after surgery at the discretion of surgeon starting in 2007 were compared with patients receiving expectant postoperative management. One hundred eighty-five patients were included in the study (study group: $N = 30$; control group: $N = 155$). Study group patients were older (56.8 vs. 50.1 years). The overall urinary retention rate was 22% with significantly lower rates in the study group compared with control (6.7 vs. 25%; $p = 0.029$). The study group had higher rates of minimally invasive surgery (61 vs. 29.7%); however, this did not impact urinary retention rate (20.6 vs. 22.7% for minimally invasive surgery vs. open surgery; $p = 0.85$). Independent predictors of urinary retention included lack of preemptive tamsulosin (odds ratio (OR), 7.67; 95% confidence interval (CI), 1.4-41.7) and cancer location in the distal third of the rectum (OR, 18.8; 95% CI, 2.1-172.8). Preemptive perioperative use of tamsulosin may significantly reduce the incidence of post-operative urinary

retention in men undergoing pelvic surgery. This may play a major role in the prevention of urinary retention, particularly in patients with distal rectal cancer.

Zhonghua Wai Ke Za Zhi[86] have done the comparative study on the clinical effectiveness and safety of alpha-blocker alone and combined alpha-blocker with an anticholinergic drug for bladder outlet obstruction (BOO) with overactive bladder (OAB). Alpha-blocker combined with an anticholinergic drug in the treatment of BOO+OAB was better than that of alpha-blocker alone, and was safe and well tolerated.

Shaw MK et al[96] aimed the study to know the prevalence of significant LUTS in men > 50 years (n = 200) undergoing inguinal hernia surgery, to identify the high-risk patients for posthernioplasty urinary retention and to assess the role of the peri-operative use of alpha-blocker in reducing the incidence of postoperative urinary retention in these patients. This study was performed at RKMSP Hospital, Kolkata for the period of 3 years from August 2005 to January 2008. All findings were documented. Prevalence of significant LUTS above 50 years undergoing inguinal hernioplasty was found to be 48% (96 out of 200). Out of 96 patients who had International, Prostate Symptoms Score>7 48 patients had maximal urine flow (Qmax) < 10 ml/second and postvoid residual urine > 100 ml, 48 patients belonged to the high risk group for postoperative retention of urine. The incidence of postoperative retention of urine among high-risk group among tamsulosin users was only 3(12.5%) out of 24 patients and among tamsulosin non-users was 10(41.6%) out of another 24 patients. Therefore, we concluded that among male patients > 50 years of age (undergoing groin hernia surgery) prevalence of significant LUTS increases

per decade. We also concluded that tamsulosin is important for the alleviation of LUTS and is quite effective for prevention of postoperative retention of urine and helpful for early discharge of patients.

In a study done by **Maldonado-Ávila M, et al**[97] where they compared the safety and efficacy of tamsulosin and alfuzosin in patients with acute urinary retention (AUR) secondary to benign prostatic hyperplasia (BPH). Even though there were no statistically significant differences when comparing the three groups, tamsulosin showed a tendency to be more effective in a successful catheter removal. The absence of target criteria in the definition of successful micturition leads us to believe that the effectiveness and viability of these two medication reported in the literature are overestimated.

Elbendary M et al[98] investigated the effect of the use of tamsulosin in combination with ketoconazole in cases of acute urinary retention (AUR) due to benign prostatic obstruction (BPO). Patients with AUR due to BPO can be treated safely with a combination of ketoconazole and tamsulosin to get a better success rate of TWOC.

Van Kerrebroeck P et al[99] assessed the efficacy and safety of a fixed-dose combination (FDC) of solifenacin and an oral controlled absorption system (OCAS) formulation of tamsulosin compared with placebo and compared with Tamsulosin OCAS (TOCAS) monotherapy in men with moderate to severe storage symptoms and voiding symptoms. The FDC of solifenacin 6 mg plus TOCAS significantly improved storage and voiding symptoms, as well as Quality of life(QoL) parameters, compared with placebo. This fixed dose combination also improved storage symptoms and QoL

compared with TOCAS alone in men with moderate to severe storage symptoms and voiding symptoms, and it was well tolerated.

METHODOLOGY

MATERIAL AND METHODS

This study is a hospital-based observational prospective study conducted to study the preventive effect of Tamsulosin on post-operative urinary retention in patients undergoing hemorrhoidectomy.

Duration of the study:

The study period was from November 2015 to September 2017.

Study population:

The study population was patients undergoing hemorrhoidectomy in the department of general surgery at R.L.Jalappa hospital and research center attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Sample size:

Based on the values from the study by Madani AH et. al., Proportion of patients with POUR was 21.1% in Placebo group and 5.9% in Tamsulosin Group. Sample size was estimated by using the difference between proportions using the formula

Sample size of 58 was obtained in each group at 20% alpha error and 80% power. Considering 10% nonresponse 58+ 5.8 ≈ 64 cases will be included in each group to make a total sample size of 128.

A total of 128 patients, who fulfilled the inclusion and exclusion criteria with different grades of hemorrhoids were included in the study.

Inclusion criteria:

All patients aged more than 18 years undergoing hemorrhoidectomy by various general surgical units in R.L.Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Exclusion criteria:

1. Patients already on indwelling Urinary catheter
2. Patients with severe and active urinary tract infections
3. Patients with neurological disease that affect bladder function
4. Patients with urological diseases such as urethral stricture, bladder or prostatic cancer
5. Patients on medications that could affect bladder function
6. Urinary incontinence and renal failure.

Ethical consideration:

The study was approved by the Ethical committee of the medical college

Method of collection of data:

- Total 128 patients with different grades of hemorrhoids undergoing hemorrhoidectomy were enrolled for the study
- Patients were subjected to the detailed inquiry regarding the mode of presentation, clinical examination and routine investigations preoperatively.
- Informed consent was obtained from the patients
- Patients were divided into following groups by odd and even method

- Group T (n= 64; odd numbers): patients were given 0.4 mg of Tab. Tamsulosin orally 6 hours before surgery and 6 to 12 hours after surgery.
- Group C (n=64; even numbers): no drug is administered

- All patients are closely followed for 24 hours post-operatively. Voiding difficulties or urinary retention was recorded.

Diagnosis of post-operative urinary retention

Post-operative urinary retention was diagnosed when a patient has hypogastric fullness, urge to micturate, distended urinary bladder within 4 hours after the operation, unable to micturate and bladder catheterization seemed inevitable.

International Prostate Symptom Score (IPSS) for Urinary symptoms:

- Mild symptoms = 1-7
- Moderate symptoms = 8-19
- Severe symptoms = 20-35

Patients with urinary symptoms underwent urine routine, urine culture sensitivity and USG abdomen and pelvis.

Statistical analysis:

Data were entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test** was used as the test of significance for qualitative data. Continuous data were represented as the mean and standard deviation. **Independent t-test** was used as the test of significance to identify the mean difference between two quantitative variables.

Graphical representation of data: MS Excel and MS Word were used to obtain various types of graphs such as bar diagram.

***p*-value** (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

RESULTS

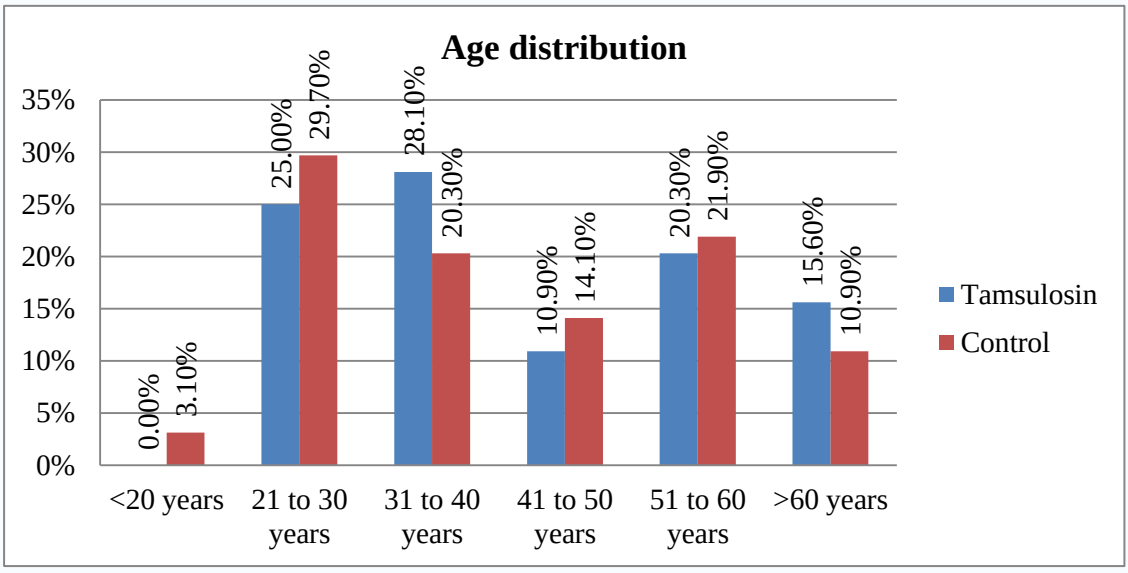
RESULTS

Table 5.1: Age distribution of subjects in the study

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Age	<20 years	0	0.0%	2	3.1%
	21 to 30 years	16	25.0%	19	29.7%
	31 to 40 years	18	28.1%	13	20.3%
	41 to 50 years	7	10.9%	9	14.1%
	51 to 60 years	13	20.3%	14	21.9%
	>60 years	10	15.6%	7	10.9%
Mean Age		43.2 ± 14.7		41.3 ± 14.3	

$\chi 2 = 3.88$, df = 5, p = 0.567

Mean age of subjects in Tamsulosin group was 43.2 ± 14.7 and in control group was 41.3 ± 14.3. Majority of subjects in Tamsulosin group were in the age group 31 to 40 years and in control group were in the age group 21 to 30 years. There was no significant difference in age distribution between two groups.



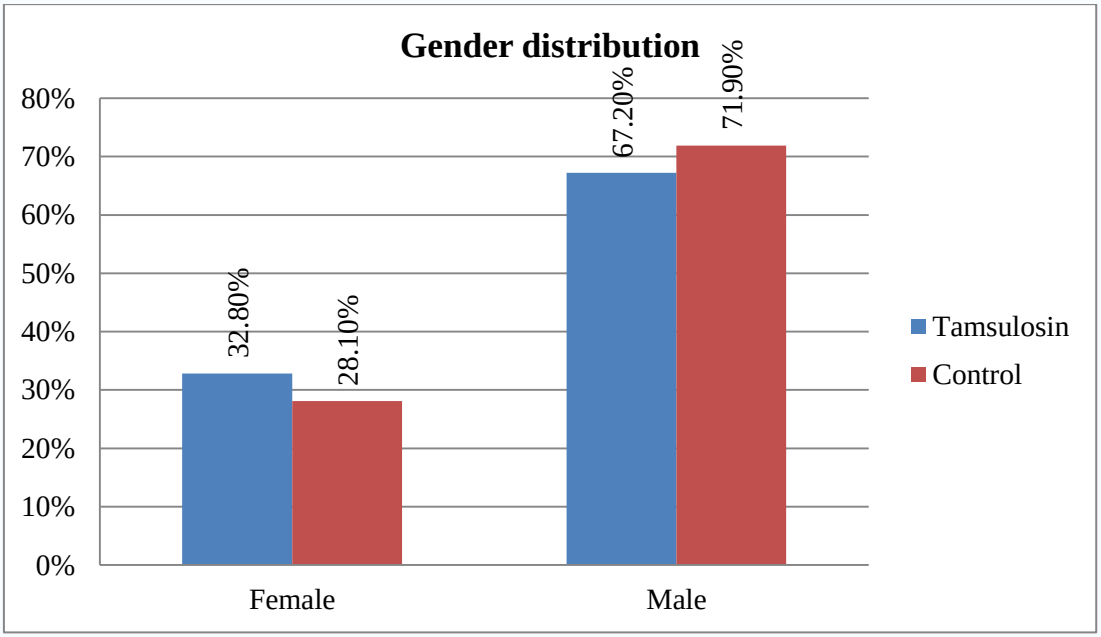
Graph 5.5: Bar diagram showing Age distribution of subjects in the study

Table 5.2: Gender distribution of subjects in the study

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Gender	Female	21	32.8%	18	28.1%
	Male	43	67.2%	46	71.9%

$\chi 2 = 0.332$, df = 1, p = 0.565

In Tamsulosin group 32.8% were females and 67.2% were males and in control group 28.1% were females and 71.9% were males. There was no significant difference in gender distribution between two groups.



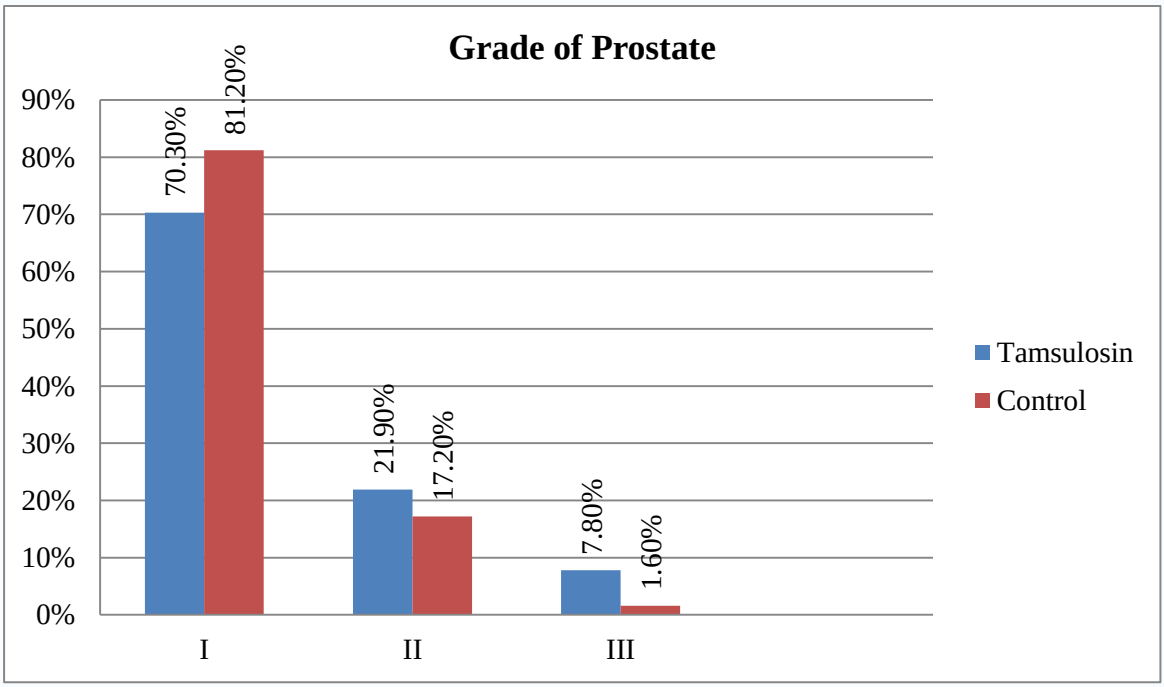
Graph 5. 6: Bar diagram showing Gender distribution of subjects in the study

Table 5.3: Grade of Prostate comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Grade of Prostate	I	45	70.3%	52	81.2%
	II	14	21.9%	11	17.2%
	III	5	7.8%	1	1.6%

$\chi 2 = 3.663$, df = 3, p = 0.300

In Tamsulosin group 70.3% had Grade I prostate, 21.9% had Grade II prostate and 7.8% had Grade III prostate. In Control group 81.2% had Grade I prostate, 17.2% had Grade II prostate and 1.6% had Grade III prostate. There was no significant difference in grade of prostate between two groups.



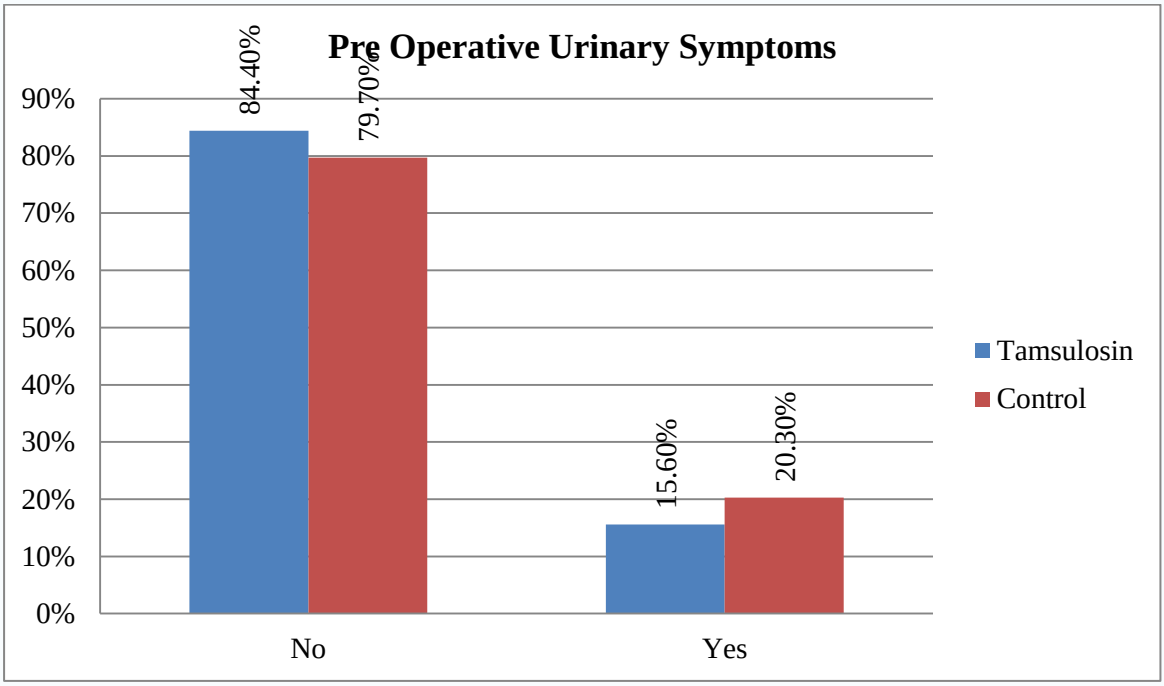
Graph 5.3: Bar diagram showing Grade of Prostate comparison between two groups

Table 5.4: Pre-Operative Urinary Symptoms comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Pre-Operative Urinary Symptoms	No	54	84.4%	51	79.7%
	Yes	10	15.6%	13	20.3%

$\chi 2 = 0.477$, df = 1, p = 0.490

In Tamsulosin group 15.6% had Pre-Operative Urinary Symptoms and in control group, 20.3% had Pre-Operative Urinary Symptoms. There was no significant difference in Pre-Operative Urinary Symptoms between two groups.



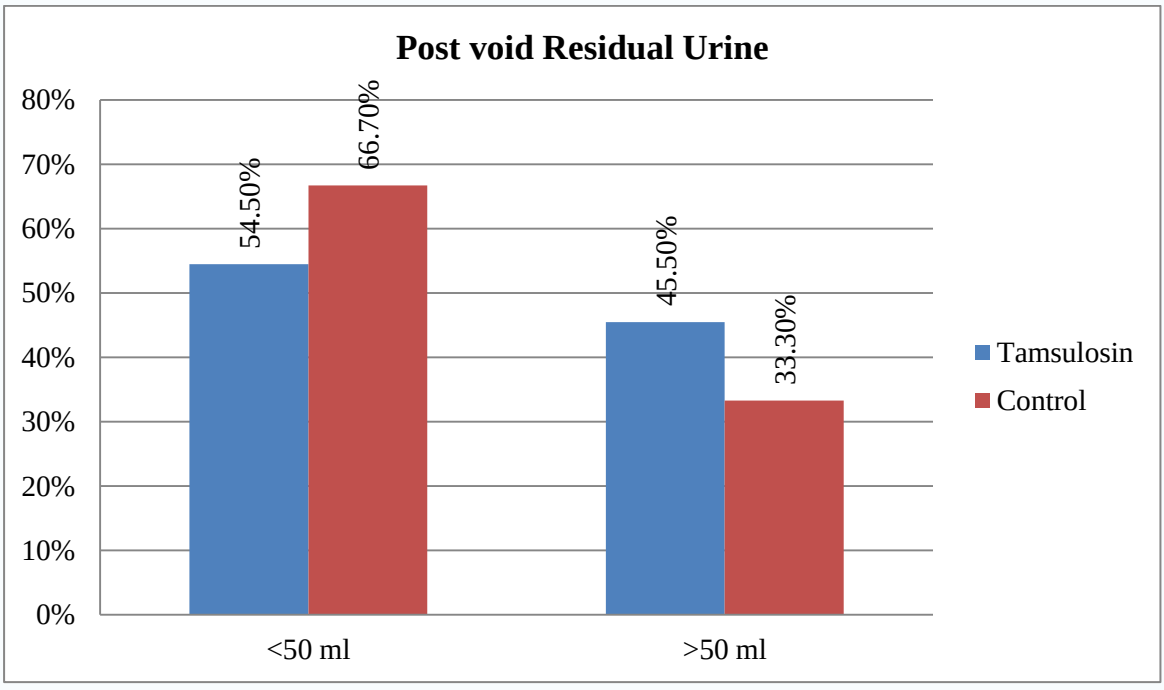
Graph 5.4: Bar diagram showing Pre-Operative Urinary Symptoms comparison between two groups

Table 5.5: Post void Residual Urine comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Post void Residual Urine	<50 ml	6	54.5%	8	66.7%
	>50 ml	5	45.5%	4	33.3%

χ 2 = 0.354, df = 1, p = 0.552

In Tamsulosin group out of 11 subjects, 45.5% had Post void Residual Urine and in control group, out of 12 subjects, 33.3% had Post void Residual Urine. There was no significant difference in Post void Residual Urine between two groups.



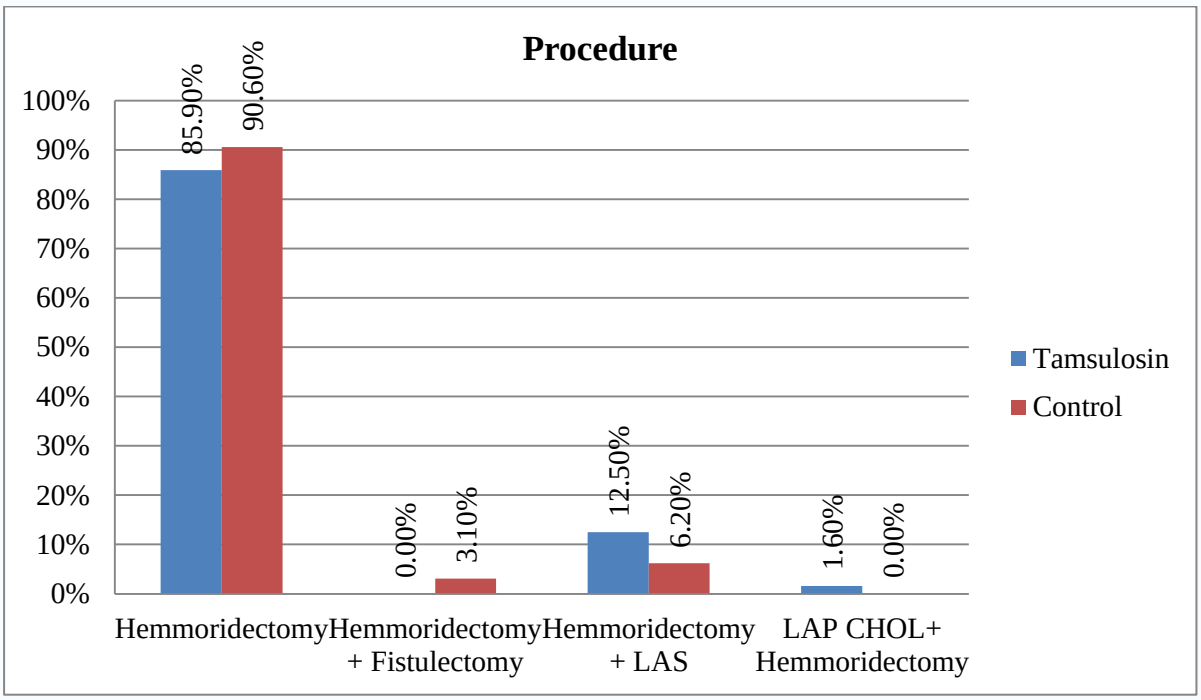
Graph 5.5: Bar diagram showing Post Void Residual Urine comparison between two groups

Table 5.6: Procedure comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Procedure	Hemmoridectomy	55	85.9%	58	90.6%
	Hemmoridectomy + Fistulectomy	0	0.0%	2	3.1%
	Hemmoridectomy + LAS	8	12.5%	4	6.2%
	LAP CHOL+ Hemmoridectomy	1	1.6%	0	0.0%

$\chi 2 = 4.413$, df = 3, p = 0.220

In Tamsulosin group 85.9% underwent Hemmoridectomy procedure, 12.5% underwent Hemmoridectomy + LAS procedure and 1.6% underwent LAP CHOL+ Hemmoridectomy. In Control group 90.6% underwent Hemmoridectomy procedure , 6.2% underwent Hemmoridectomy + LAS procedure and 3.1% Hemmoridectomy + Fistulectomy. There was no significant difference in procedure between two groups.



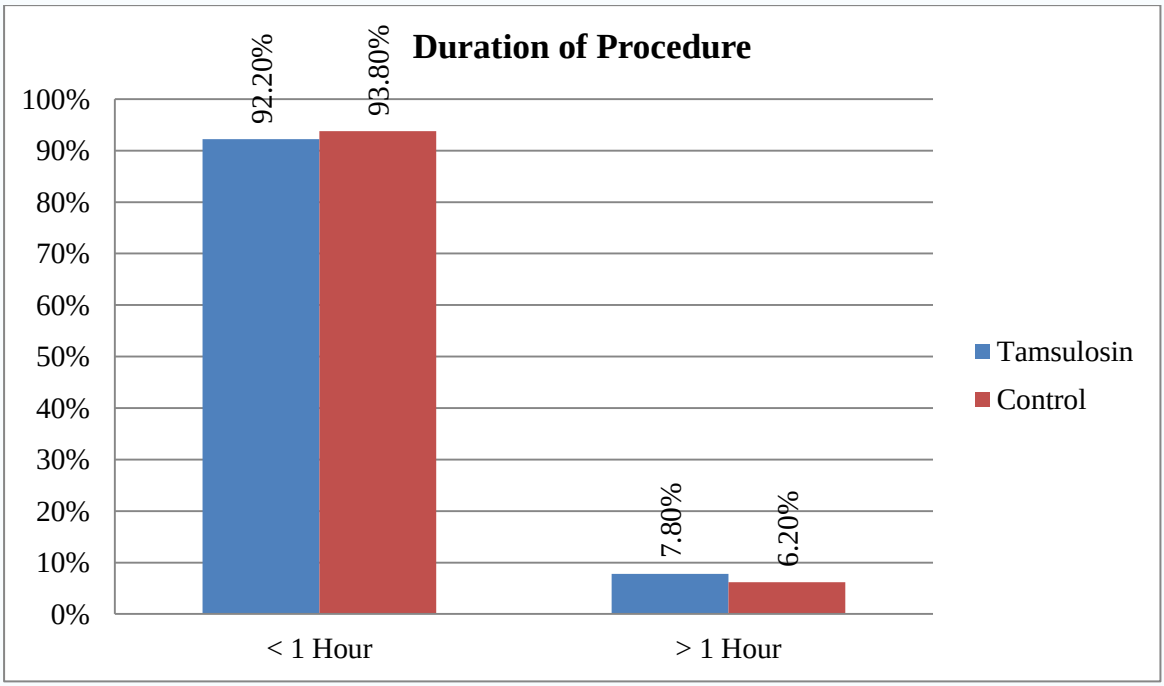
Graph 5.6: Bar diagram showing Procedure comparison between two groups

Table 5.7: Duration of Procedure comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Duration of Procedure	< 1 Hour	59	92.2%	60	93.8%
	> 1 Hour	5	7.8%	4	6.2%

χ 2 = 0.120, df = 1, p = 0.730

In Tamsulosin group, duration of surgery was <1 hr in 92.2% and >1 hr in 7.8% and in control group duration of surgery was <1 hr in 93.8% and >1 hr in 6.2%. There was no significant difference in duration of procedure between two groups.



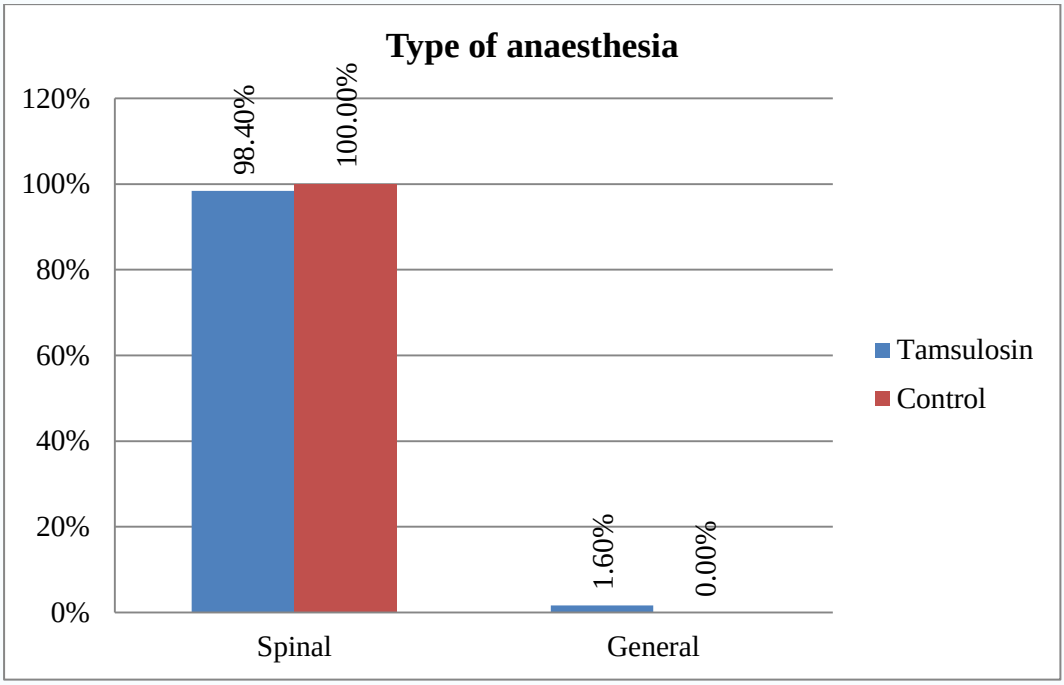
Graph5.7: Bar diagram showing Duration of Procedure comparison between two groups

Table 5.8: Type of anesthesia comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Type of anesthesia	Spinal	63	98.4%	64	100.0%
	General	1	1.6%	0	0.0%

$\chi 2 = 1.008$, df = 1, p = 0.315

In Tamsulosin group 98.4% underwent surgery under spinal anesthesia and 1.6% underwent surgery under General anesthesia. In control group, 100% underwent surgery under spinal anesthesia. There was no significant difference in the type of anesthesia between two groups.



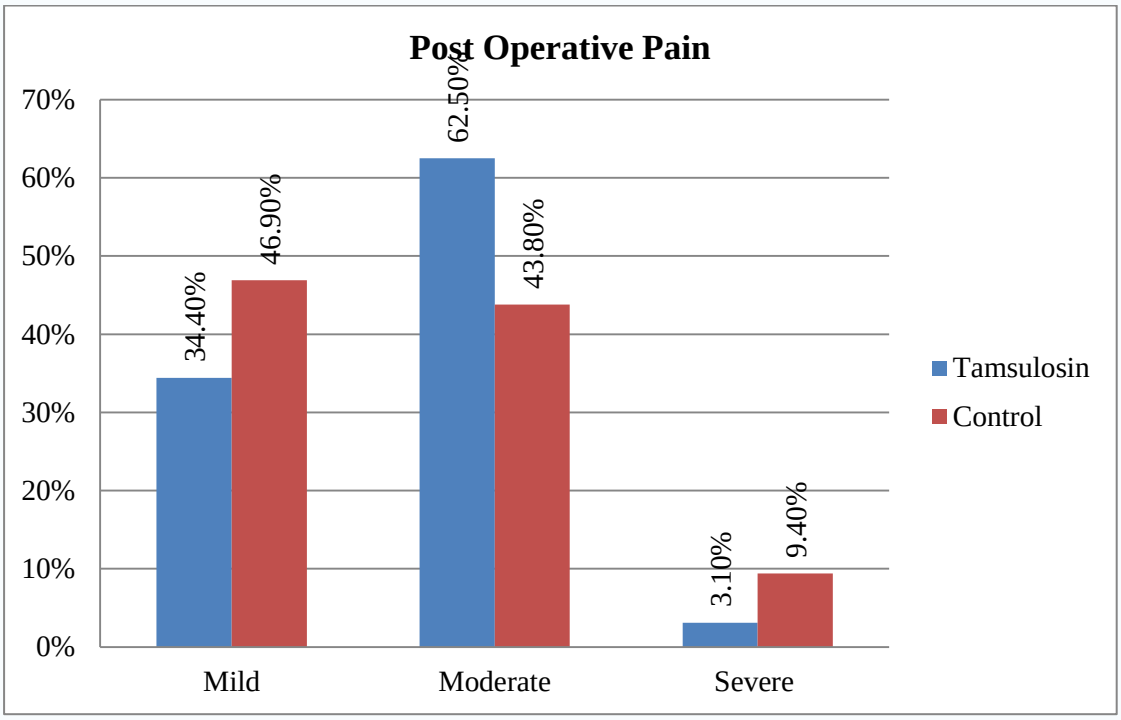
Graph 5.8: Bar diagram showing Type of anesthesia comparison between two groups

Table 5.9: Post-Operative Pain comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Post-Operative Pain	Mild	22	34.4%	30	46.9%
	Moderate	40	62.5%	28	43.8%
	Severe	2	3.1%	6	9.4%

χ 2 = 5.348, df = 2, p = 0.069

In Tamsulosin group, 34.4% had mild, 62.5% had moderate and 3.1% had severe post-operative pain. In control group 46.9% had mild, 43.8% had moderate and 9.4% had severe post-operative pain. There was no significant difference in post-operative pain between two groups.



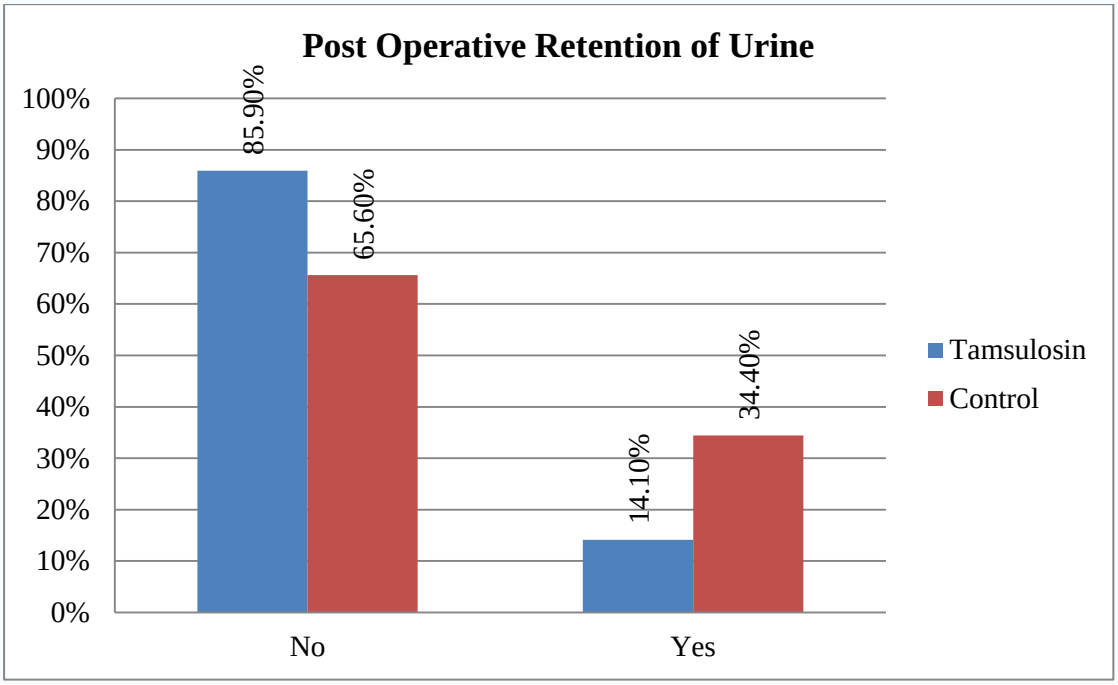
Graph5.9: Bar diagram showing Post-Operative Pain comparison between two groups

Table 5.10: Post-Operative Retention of Urine comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Post-Operative Retention of Urine	No	55	85.9%	42	65.6%
	Yes	9	14.1%	22	34.4%

χ 2 = 7.194, df = 1, p = 0.007*

In Tamsulosin group 14.1% had Post-Operative Retention of Urine and in control group, 34.4% had Post-Operative Retention of Urine. This difference in Post-Operative Retention of Urine between two groups was statistically significant.



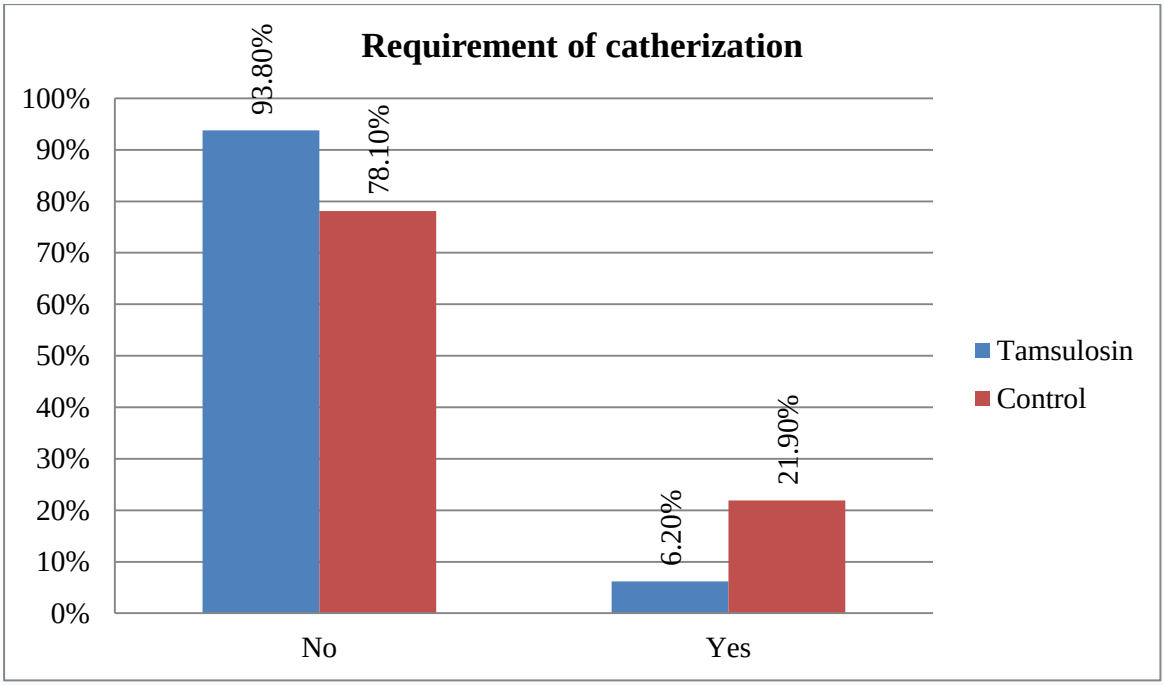
Graph 5.10: Bar diagram showing Post-Operative Retention of Urine comparison between two groups

Table 5.11: Requirement of catheterization comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Requirement of catheterization	No	60	93.8%	50	78.1%
	Yes	4	6.2%	14	21.9%

$\chi 2 = 6.465$, df = 1, p = 0.011*

In Tamsulosin group 6.2% required catheterization and in control group 21.9% required catheterization. This difference in Requirement of catheterization between two groups was statistically significant.



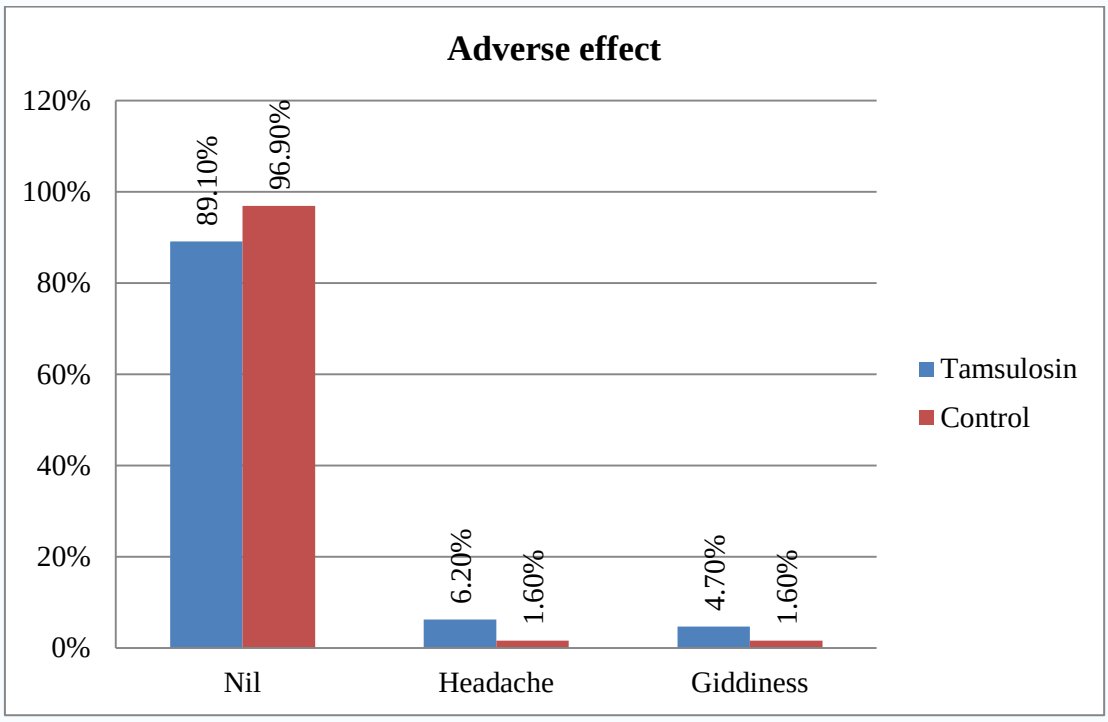
Graph 5.11: Bar diagram showing Post-Operative Retention of Urine comparison between two groups

Table 5.12: Adverse effect comparison between two groups

		Group			
		Tamsulosin		Control	
		Count	%	Count	%
Adverse effects	Nil	57	89.1%	62	96.9%
	Headache	4	6.2%	1	1.6%
	Giddiness	3	4.7%	1	1.6%

χ 2 = 3.010, df = 2, p = 0.222

In Tamsulosin group 6.2% had a headache and 4.7% had giddiness and in control group, 1.6% had a headache and giddiness respectively. There was no significant difference in adverse effects between two groups.

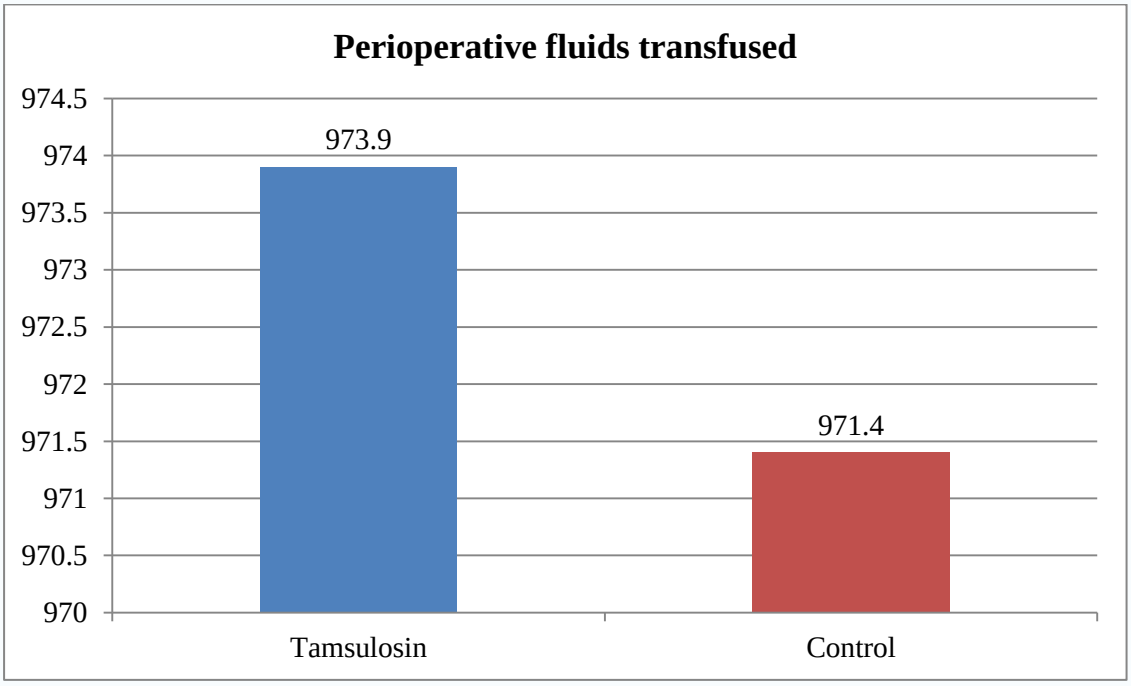


Graph5.12: Bar diagram showing Adverse effects comparison between two groups

Table 5.13: Perioperative fluids transferred comparison between two groups

		Perioperative fluids transfused	
		Mean	SD
Group	Tamsulosin	973.9	81.2
	Control	971.4	67.5
P value		0.850	

Mean Perioperative fluids transferred in Tamsulosin group was 973.9 ± 81.2 ml and in control group was 971.4 ± 67.5 ml. There was no significant difference in mean Perioperative fluids between two groups.



Graph 5.13: Bar diagram showing Perioperative fluids transferred comparison between two groups

DISCUSSION

DISCUSSION

The study was a hospital-based randomized prospective study undertaken to study preventive effect of Tamsulosin on postoperative urinary retention in men undergoing elective surgery.

The study population included 128 patients undergoing hemorrhoidectomy in the department of general surgery at R.L.Jalappa hospital and research center attached to Sri Devaraj Urs Medical College Kolar during the study period from November 2015 to September 2017. The patients already on the indwelling Urinary catheter, with active urinary tract infections, with the neurological disease that affect bladder function, patients with urological diseases such as urethral stricture, bladder or prostatic cancer**,** on medications that could affect bladder function**,** urinary incontinence and renal failure patients were excluded from the study.

The study was approved by the Ethical Committee of the Medical College. A total number of 128 subjects enrolled for the study were divided into two groups; Group T with patients was given 0.4 mg of Tamsulosin orally 6 hours before surgery and 6 to 12 hours after surgery. Patients in Group C no drug was administered. All cases were closely followed for 24 hours postoperatively, during this period any suprapubic discomfort, voiding difficulties and urinary retention was recorded.

1. Age:

In our study, It was observed that majority of patients were in the age group 21 to 40 years (51.55%). Mean age of patients was 42.25 ± 14.5. It was observed that mean age in Group C and Group T was 41.3 ± 14.3 and 43.2 ± 14.7 years respectively.

There was no significant difference in age distribution between two groups. (χ 2 = 3.88, df = 5, p = 0.567) (Table – 5.1).

Similar findings were observed in the study done by **Ahmad MM et al[85],** Preventive effect of tamsulosin on postoperative urinary retention in benign anorectal surgeries. (Table 6.1)

Ali Hamidi Madani et al[78], compare the prophylactic effect of Tamsulosin with placebo on postoperative urinary retention. All patients were male, and the mean age was same in both Tamsulosin and placebo with no statistical difference. (Table 6.1)

Mohammadi-Fallah M et al[5] on prophylactic effect of Tamsulosin, a super-selective alpha-1a adrenergic blocking agent, on the development of urinary retention in men undergoing elective inguinal herniorrhaphy, observed no statistically significant differences between the two groups in terms of age. (Table 6.1)

Vitaliy Poylin et al[94], Perioperative use of tamsulosin significantly decreases rates of urinary retention in men undergoing pelvic surgery. The mean age was same in both Tamsulosin and nontamsulosin group with no statistical difference. (Table 6.1)

Table 6. 1: Results comparison with other studies in terms of age

	Author	Study group	Control group	P value
Age	**Mohammadi-Fallah M et al[5]**	Tamsulosin	Placebo	0.18
	Ahmad MM et al[85]	Tamsulosin	Placebo	0.3
	Madani AH et al[78]	Tamsulosin	Placebo	>0.05
	Poylin V et al[94]	Tamsulosin	No drug	>0.05
	Present study	Tamsulosin	No drug	0.567

In our study patients, 18-70 years old were only included because in older age there is a decrease in contractility of detrusor and increase in the incidence of some diseases such as benign hyperplasia of the prostate that present with urinary symptoms and may interfere with patient randomization and study results (development of urinary retention).

2. Sex:

In Tamsulosin group 32.8% were females and 67.2% were males and in control group 28.1% were females and 71.9% were males. There was no significant difference in gender distribution between two groups. (χ 2 = 0.332, df = 1, p = 0.565) (Table – 5.2)

Similarly, there were no statistically significant differences were found between the two groups in terms of gender in study done by **Ahmad MM et al**[85] and **Toyonaga et al**[87]

The influence of gender on urinary retention is debatable, as some authors have reported that male sex is a risk factor , and others have reported that there is no statistical difference between the gender. **Toyonaga et al**[87] in this study the female sex is shown to be the independent risk factor and have described various possible reasons for same. In our study males have the higher incidence of POUR. Statistically, no significant difference was found in terms of sex among the two groups (p= 0.540).

3. Pre-operative urinary symptoms:

In our study, it was found that few patients had mild pre-operative urinary symptoms, in Tamsulosin group 15.6% and in control group 20.3%. No patients had the severe

form of urinary symptoms. Here parameters were almost comparable and there was no significant difference in terms of pre-operative urinary symptoms between two groups. (χ 2 = 0.477, df = 1, p = 0.490). (Table- 5.4)

Table 6.2: Result comparison with other studies in terms of pre-operative urinary symptoms

	Author	*p*-value
Pre-Operative urinary symptoms	**Mohammadi-Fallah M et al[5]**	0.30
	Ahmad MM et al[85]	0.7
	Present study	0.49

The findings were in accordance with the study done by **Mohammadi-Fallah M et al**[5] and **Ahmad MM et al**[85] who observed no statistically significant differences between the two groups in terms of preoperative symptoms. (Table – 6.2)

4. Different surgical procedure:

The majority of surgeries in Group C and Group T were hemorrhoidectomy i.e.90.6% and 85.9% respectively. In tamsulosin group, one patient underwent laparoscopic cholecystectomy along with hemorrhoidectomy. Few other patients underwent other anorectal surgeries like fistula surgery (two control group) and LAS (eight in tamsulosin and six in control) along with hemorrhoidectomy. The observation found that there is no statistical difference in the type of surgery among two study groups. (X2=4.413 df=3 P=0.220; No statistically significant) (Table 5.6).

Table 6.3: Results comparison with other studies in terms of different surgical procedures

Author →	Ahmad MM et al[85] n= 626			Present study n= 128			Mohammadi-Fallah M et al[5] n= 80			Madani AH et al[78] n= 232			Gonullu NN et al[7] n= 156			Poylin V et al[94] n= 185		
Procedure ↓	C n= 313	T n= 313	P	C n= 68	T n= 68	P	C n=40	T n=40	P	C n=114	T n=118	P	C n=72	T n=84	P	C n=155	T n=30	P
Hemmoridectomy	127	153	0.2	58	55	0.22			0.3			>0.05			>0.05			0.829
Fistula surgery	50	56																
MAD/LAS	97	83																
Hemmoridectomy + Fistulectomy				2	0													
Hemmoridectomy + LAS				4	8													
LAP CHOL+ Hemmoridectomy				0	1													
Incision & Drainage	33	47																
Hernia							40	40		11	14		72	84				
Minimal invasive surgery																18	44	
Ileal or colonic pouch																43	39	
Varicocelectomy										57	58							
Scrotal surgery										46	46							

5. Duration of surgery:

The majority of patients surgeries in Group C and Group T took <60 minutes i.e. 93.8% and 92.2% respectively. There was no statistical difference in duration of surgeries among two study groups. (X2=0.120; df=1; P>0.730; No statistically significant) (Table 5.7)

Similar findings were observed in the study done by **Madani AH et al**[78] who observed no statistical difference in terms of duration of surgery among both groups. The findings were in accordance with the study done by **Mohammadi Fallah M et al**[5] (p=0.70), **Ahmad MM et al**[85] (p=0.6) and **Poylin V et al**[94] (p=0.519) who observed no statistically significant differences between the two groups in terms of duration of surgery.

6. Peri-operative fluid:

In our study, it was observed that mean perioperative fluid in Group C and Group T was 971.4 ± 67.5 and 973.9 ± 81.2 ml, respectively. There was no statistical difference among perioperative fluid administration in two study groups. (P=0.850) (Table 5.13)

Table 6.4: Results comparison with other studies in terms of peri-operative fluids

	Poylin V et al[94] n= 185			**Madani AH et al[78] n= 232**			**Present study n= 128**		
Perioperative fluid	C	T	**P**	C	T	**P**	C	T	**P**
	3499 ± 1093	3499 ± 1093	**0.501**	1096.67 ± 214.08	1094.92 ± 200.78	**>0.05**	971.4 ± 67.5	973.9 ± 81.2	**0.850**

The findings were in accordance with the study done by **Madani AH et al**[78] and **Poylin V et al**[94] who observed no statistically significant differences between the two groups in terms of perioperative fluid. (Table 6.4)

The excessive perioperative fluid intake leads to bladder overdistention that increases the risk of POUR. So, restriction of perioperative fluid intake may prevent POUR. **Toyonaga et al**[87] in this study, on postoperative urinary retention after surgery for benign anorectal disease: potential risk factors and strategy for prevention, has mentioned that the incidence of urinary retention was significantly lower in the fluid restriction group than in the control group (P<0.0001). Similarly, in the subgroup of patients who underwent hemorrhoidectomy, fluid restriction significantly decreased the urinary retention rate (P=0.0028).

Similarly, in a randomized prospective study of perioperative fluid restriction in anorectal surgery, **Bailey and Ferguson**[100] were able to reduce urinary retention from 14.9 to 3.5%.

7. Prostate size:

In our study, USG pelvis was considered only for patients with pre-operative urinary symptoms to evaluate the prostate size and to rule out the prostate and bladder pathology. Rest other patients clinical digital rectal examination was taken into account. Most of the patients were having grade I prostatomegaly, In Tamsulosin group 70.3% had Grade I prostate, 21.9% had Grade II prostate and 7.8% had Grade III prostate. In Control group 81.2% had Grade I prostate, 17.2% had Grade II prostate and 1.6% had Grade III prostate. There is no statistically significant

difference in grade of prostate between two groups.(χ 2 = 3.663, df = 3, p = 0.300). (Table 5.3)

The findings were in contrast with the study done by **Mohammadi-Fallah M et al[5]** who observed no statistically significant differences between the two groups in terms of prostate size. (p=0.30).

Similar findings were observed in the study done by **Ahmad MM et al[85]** who observed no statistical difference in terms of prostate size among both the study groups.

8. Post-Void Residual (PVR) Urine:

In our study, 23 patients with urinary symptoms were asked for usg pelvis to detect the prostate pathology and post void residual urine, among them 5 patients in tamsulosin and 4 patients in control group were found that the post-void residual (PVR) urine >50 ml. which corresponds to 45.5% and 33.3%in tamsulosin and control group respectively. There was no statistical difference in post-void residual (PVR) among two groups. (χ 2 = 0.354, df = 1, p = 0.552 ; No statistically significant) (Table 5.5)

Table 6.5: Results comparison with other studies in terms of PVR urine

Authors	Mohammadi Fallah M et al[5] n= 80			Ahmed MM et al[85] n= 626			Present study n= 128		
Post void residual urine	C	T	P	C	T	P	C	T	P
< 50ml	29	31	0.6	77	73	0.7	8	6	0.552
> 50ml	11	9		23	27		4	5	

Similar findings were observed in the study done by **Ahmed MM et al[85]** who observed no statistical difference in post void residual urine among both the study groups (p=0.7). (Table 6.5)

The findings were in accordance with the study done by **Mohammadi-Fallah M et al[5]** who observed no statistically significant differences between the two groups in terms of post void residual urine. (p=0.60). (Table: 6.5)

9. Post-Operative pain:

Toyonaga et al[87] also explained about the post-operative pain, was one of the independent risk factors for POUR. Shows prophylactic analgesic treatment drastically reduces the incidence of POUR. Thus UR seems to be related to the degree of pain and not to the side effects of analgesics. Similarly in our study patients with moderate to severe pain had the higher incidence of POUR than mild post-operative pain. In tamsulosin group, among 9 patients, 7 with moderate and 2 with severe post-operative pain had UR. In control group, among 22 patients, 12 with moderate, 6 with severe and 4 with mild post-operative pain had UR. But statistically no significant difference was found in terms of post-operative pain among the two groups (p= 0.323). (Table 5.9) (Table 6.6)

Table 6.6: Results comparison with other studies in terms of post-operative pain

Post-Operative Pain	Tamsulosin		Control		P value
	Count	%	Count	%	
Mild	0	0.0%	4	18.2%	0.323
Moderate	7	77.8%	12	54.5%	
Severe	2	22.2%	6	27.3%	

10. Post-Operative Urinary Retention (POUR):

In our study, it was observed that in Group C 22 (34.4%) patients had POUR while in Group T only 9 (14.1%) had POUR after surgery. There was the statistically significant difference in terms of POUR among two groups. (χ 2 = 7.194, df = 1, p = 0.007 statistically significant) (Table 5.10)

The findings were in accordance with the study done by **Gonullu NN et al**[7] who observed that 18 patients in the placebo group and 9 patients in Tamsulosin group had urinary retention. With overall UR is 8.33%. There were statistically significant differences between the two groups in terms of POUR ($p<0.05$). (Table 6.7)

11. POUR with Catheterization:

In our study, patients with suprapubic fullness, tenderness, percussible urinary bladder, with difficulty in passing urine, a conservative efforts such as warming by hot water bag application over the suprapubic region, encouraging patient to stand up and walk were made, following which eight patients in control and five patients in tamsulosin group could manage to empty the bladder successfully.

Patients in whom conservative efforts were unsuccessful and the patients were clearly uncomfortable a Foley urethral catheterization was performed under sterile technique

to drain the urine and left in place for 24 hours post operatively, in the control group 22 patients had urinary retention, of whom 14 required catheterizations. There were 9 patients had urinary retention in tamsulosin treated group and 4 patients required catheterization. χ 2 = 6.465, df = 1, p = 0.011. The difference in requirement of catheterization between two groups was statistically significant. (Table 6.7)

Table 6.7: Results comparison with other studies in terms of POUR and POUR + Catheterization

Author	Group *p-value*	POUR	POUR + Catheterization	Overall UR
Mohammadi Fallah M et al[5] n= 80	C (n=40)		6	8.75%
	T (n=40)		1	
	P		**0.04**	
Ahmad MM et al[85] n= 626	C (n=313)		56	10.2%
	T (n=313)		8	
	P		**<0.0001**	
Madani A H et al[78] n= 232	C (n=114)		24	13.3%
	T (n=118)		7	
	P		**0.001**	
Gonullu N N et al[7] n= 156	C (n=72)	18	10	8.33%
	T (n=84)	9	3	
	P	**<0.05**	**< 0.05**	
Poylin V et al[94] n= 185	C (n=155)		38	22%.
	T (n=30)		2	
	P		**0.029**	
Present study n= 128	C (n=64)	22	14	14.06%
	T (n=64)	9	4	
	P	**0.007**	**0.011**	

The findings were in accordance with **Poylin** V **et al[94] (p= 0.029)**, **Gonullu N N et al[7] (p= <0.05), Madani AH et al[78] (p= <0.001), Ahmad MM et al[85] (p=0.001), Mohammadi Fallah et al[5] (p=0.04)** in terms of POUR with need of catheterization. (Table 6.7).

12. Anesthesia:

In our study, all patients underwent hemorrhoidectomy surgery under spinal anesthesia except one case, in which laparoscopic cholecystectomy was done along with hemorrhoidectomy. From the statistical point, it does not show the significant difference. (χ 2 = 1.008, df = 1, p = 0.315) (Table: 5.8)

Patients on tamsulosin drug had few adverse effects like a headache (4 patients) and giddiness (3 patients), which were developed after 24hours of surgery. Which were managed symptomatically. Three patients with headache and one patient with giddiness had their systolic and diastolic blood pressure ranging from 90 to 100mmhg and 50 to 70mmhg respectively. Which were managed by adequate hydration in the form of intravenous fluids and adequate oral intake of fluids. No significant difference in adverse effects between two groups.

Many different methods have been tried to prevent POUR complication, including the use of parasympathomimetic agents, use of α-adrenergic blockers, use of anxiolytic agents, restriction of perioperative fluid intake, avoidance of anal packing, sitz baths, use of local anesthesia, use of short-acting anesthesia, and outpatient surgery. Some precautions, such as limitation of fluid intake, early mobilization, warm compress to

the suprapubic area, and the use of short-acting local or spinal anesthesia had been reported to prevent this complication.

The limitation of the study includes the relatively small sample size, heterogeneous populations patient with various diagnose included in the study. Therefore, various studies on large scale should be conducted to investigate the efficacy of tamsulosin compared with control group in preventing POUR.

CONCLUSION

CONCLUSION

Urinary retention is most the common post-operative complication following anorectal surgeries, often in patients undergoing hemorrhoidectomy. In the study, control and tamsulosin group showed no statistical difference in terms of perioperative fluids, duration of surgery and post void residual urine.

Our study infers that tamsulosin significantly decreases the incidence of post-operative urinary retention. It can be considered as the perioperative drug in patients undergoing hemorrhoidectomy.

SUMMARY

SUMMARY

The present study was conducted on patients undergoing hemorrhoidectomy in the department of general surgery of Sri Devaraj Urs medical college, Tamaka Kolar during the period of November 2015 to September 2017.

The objective of the study was to study the efficacy of Tamsulosin in the prevention of incidence of POUR in patients undergoing hemorrhoidectomy and compare with Control group in whom Tamsulosin was not be administered.

Our study sample size was 128. Patients were divided into two groups, 64 in each, based on odd (tamsulosin) and even (control- non-tamsulosin group) method.

In our study, the majority of the patients were under the age of 21 to 40 years, mean age was 42.25. Both sexes included in the study, with the male being 69.5% and females 30.45%.

About 15.6% in tamsulosin and 20.3% in control group had mild pre-operative urinary symptoms.

Hemorrhoidectomy alone was done in 90.6% and 85.9% in control and tamsulosin group respectively, few patients underwent other anorectal surgeries like fistula surgery (two control group) and LAS (eight in tamsulosin and six in control) along with hemorrhoidectomy.

Majority of patients, the procedure took <60minutes i.e., 93.8% and 92.2% in group C and Group T respectively.

The mean perioperative fluid administered in Group C and Group T was 971.4 ± 67.5 and 973.9 ± 81.2 ml, respectively.

In our study, 23 patients with mild urinary symptoms underwent usg, among them, 5 patients in tamsulosin and 4 patients in control group were found that the post-void residual (PVR) urine >50 ml. which corresponds to 45.5% and 33.3% in tamsulosin and control group respectively.

There was no significant difference in Incidence of Post-Operative Urinary Retention between Tamsulosin group and control with respect to age, sex, duration of surgery, peri-operative fluid, post-operative pain and post-void residual (PVR) urine.

In our study, it was observed that in Group C 22 (34.4%) patients had POUR while in Group T only 9 (14.1%) had POUR after surgery. There was the statistically significant difference in terms of POUR among two groups.

In tamsulosin group, among 9 patients, 7 with moderate and 2 with severe post-operative pain had UR. In control group, among 22 patients, 12 with moderate, 6 with severe and 4 with mild post-operative pain had UR.

In the control group 22 patients with UR, 14 required catheterization and 9 patients with UR in tamsulosin treated group 4 patients required catheterization. The

difference in requirement of catheterization between two groups was statistically significant.

It was observed that patients in control group had more POUR as compared to Tamsulosin group with the statistical difference. Thus, our study concluded that perioperative Tamsulosin administration reduces the incidence of postoperative urinary retention in patients undergoing hemorrhoidectomy.

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ANNEXURE

ANNEXURE I (KANNADA)

ರೋಗಿಯ ಮಾಹಿತಿ ನಮೂನೆ

ಅಧ್ಯಯನದ ಶೀರ್ಷಿಕೆ: "ಊಇಒಔಖಊಔಖಆಇಅಖಿಔಒಜ ಒಳಪಡುವ ರೋಗಿಗಳಲ್ಲಿ ಪೋಸ್ಟ್ ಆಪರೇಟಿವ್ ಮೂತ್ರರೋಧ ನಿವಾರಣೆಗೆ ಖಿಂಒಖಗಐಔಖಖಓ ದಕ್ಷತೆಯ ಅಧ್ಯಯನ"

ಅಧ್ಯಯನದ ಸ್ಥಳ: ಶ್ರೀ ದೇವರಾಜ ಅರಸು ವೈದ್ಯಕೀಯ ಕಾಲೇಜು, ಖಿಚಟಚಜಞಚ, ಕೋಲಾರ ಜೋಡಿಸಲಾದ ಆರ್ ಎಲ್ ಜಾಲ ಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ.

ವಿವರಗಳು:

18 ವರ್ಷಗಳ ಹೆಚ್ಚು ವಯಸ್ಸಿನ ಃಜಟಠಡಿಡಿಥಜಜಛಿಣಠಟಡಿ ಒಳಪಡುವ ರೋಗಿಗಳು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಸೇರಿಸಲಾಗುವುದು. ಅಂತಸ್ಥವಾಗಿರುವ ಮೂತ್ರದ ಕ್ಯಾತಿಟರ್, ಮೂತ್ರಕೋಶ ಕಾರ್ಯ, ಇಂತಹ ಮೂತ್ರದ ಆಕ್ಷೇಪಣೆ, ಮೂತ್ರಕೋಶ ಅಥವಾ ಪ್ರಾಸ್ಟೇಟ್ ಕ್ಯಾನ್ಸರ್ ಗಡಿಠಟಠರುಛಿಚಟ ರೋಗಗಳು, ನಂತರದ ರಕ್ತದೊತ್ತಡ ಜೊತೆ ಮೂತ್ರಕೋಶ ಕಾರ್ಯ ಬಾಧಿಸಬಹುದಾದ ಔಷಧಿಗಳು ಮತ್ತು ರೋಗಿಗಳ ಮೇಲೆ ಪರಿಣಾಮ ಬೀರುವ ಸಕ್ರಿಯ ಮೂತ್ರದ ಸೋಂಕು, ನರಸಂಬಂಧಿ ಕಾಯಿಲೆಗಳಿಗೆ ರೋಗಿಗಳಿಗೆ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಹೊರತುಪಡಿಸಲಾಗಿದೆ.

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ರೋಗಿಗಳು ಕೆಲವು ವಾಡಿಕೆಯ ಮೂಲಭೂತ ರಕ್ತ ಮತ್ತು ನಿರ್ದಿಷ್ಟ ಪರೀಕ್ಷೆಗೆ ಒಳಗಾಗಬೇಕಾಗುತ್ತದೆ.

ನೀವು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚೆಸಿ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಬಹುದು. ನೀವು ಯಾವುದೇ ತರಹದ್ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೆಳಬಹುದು. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಒಪಿದಲ್ಲಿ ನಿಮ್ಮಿಂದ ಅಥವಾ ನಿಮ್ಮಗೆ ಜವಾಬ್ಧಾರರಾದ ವ್ಯಕ್ತಿಯಿಂಧ ಅಥವಾ ಇಬರಿಂದಲ್ಲು ಅಧ್ಯಯನಕೆ ಸಂಬಂದಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಸಂಗ್ರಹಿಸುತ್ತೆವೆ. ಈ ರೀತಿ ಸಂಗ್ರಹಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಪ್ರೌಢಪ್ರಬಂಧದಲ್ಲಿ ಪ್ರಕಟಣೆಗೆ ಬಳಸಲಾಗುತ್ತದೆ.

ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಿದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿ ಇಡಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ನಿಮ್ಮ ಮಾಹಿತಿಯನ್ನು ಬಹಿರಂಗ ಮಾಡಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ತೋರಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವು ಕಾಲೇಜಿನ ನೈತಿಕ ಸಮಿತಿಯು ವಿಮರ್ಷಿಸುತದೆ ಮತ್ತು ನೀವು ಉಚಿತವಾಗಿ ಕಾಲೇಜಿನ ನೈತಿಕ ಸಮಿತಿಯ ಯಾವುದೇ ಸದಸ್ಯರೊಂದಿಗೆ ಸಂಪರ್ಕಿಸಬಹುದು. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಒಪ್ಪಿಕೊಳ್ಳಲು ಯಾವುದೇ ಕಡ್ಡಾಯವಿರುವುದಿಲ್ಲ. ನೀವು ಭಾಗವಹಿಸಲು ಇಚ್ಚಿಸದಿದ್ದರೆ ನೀವು ಪಡೆಯುತಿರುವ ಚಿಕಿತ್ಸ್ ಯಲ್ಲಿ ಮತ್ತು ಉಪಚಾರದಲ್ಲಿ ಬದಲಾಗುವುದಿಲ್ಲ. ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಒಪಿದರೆ ನಿಮ್ಮ ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು ಒದಗಿಸುವುದು ಅಗತ್ಯವಿರುತದೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ ಸಂಪರ್ಕಕ್ಕೆ
ಡಾ ಸಂದೀಪ್ ರೆಡ್ಡಿ (ಸ್ನಾತಕೋತ್ತರ)
ಜನರಲ್ ಸರ್ಜರಿ,
ಖಆಗಒಆ, ಕೋಲಾರ.

ANNEXURE II (ENGLISH)
PATIENT INFORMATION SHEET

Study title: "STUDY ON E EFFICACY OF TAMSULOSIN IN PREVENTION OF POST OPERATIVE URINARY RETENTION IN PATIENTS UNDERGOING HEMORRHOIDECTOMY"

Study location: R L Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Details-

Patients aged more than 18 years undergoing hemorrhoidectomy will be included in this study. Patients on the indwelling urinary catheter, active urinary tract infections, neurological disease that affect bladder function, urological diseases such as urethral stricture, bladder or prostatic cancer, patients on medications that could affect bladder function and patients with post-operative hypotension will be excluded from the study.

Patients in this study will have to undergo routine preoperative investigations, urine routine analysis, Ultrasound of abdomen and pelvis for residual urine and prostate volume and urine culture sensitivity if urine routine is abnormal.

Please read the following information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study we will collect information (as per proforma) from you or a person responsible for you or both. Relevant history will be taken. This information collected will be used only for dissertation and publication.

All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. This study has been reviewed by the Institutional Ethics Committee and you are free to contact the member of the Institutional Ethics Committee.

There is no compulsion to agree with this study. The care you will get will not change if you don't wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

For further information contact:

Dr. Sandeep Reddi (Postgraduate)

Department of General Surgery,

SDUMC, Kolar

ANNEXURE III
CERTIFICATION OF CONSENT:

I have read the patient information sheet and I have had the opportunity to any question. Any question that I have asked, have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Name of the Patient: _____

Signature: _____

In the presence of witness Name/Signature of Research person

_____

ಸಮ್ಮತಿಯ ಪ್ರಮಾಣೀಕರಣ:

ನಾನು ಮಾಹಿತಿ ಪ್ರತಿಯನ್ನು ಓದಿರುತೇನೆ. ನನಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಕೇಳಲು ಅವಕಾಶ

ಕೊಟ್ಟಿರುತ್ತಾರೆ. ನಾನು ಕೇಳಿರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ಸಮಾಧಾನಕರವಾಗಿ ಉತ್ತರಿಸಲಾಗಿದೆ. ನಾನು ಈ

ಸಂಶೋಧನೆಯಲ್ಲಿ ಸ್ವಇಚ್ಛೆಯಿಂದ ಭಾಗವಹಿಸಲು ಸಮ್ಮತಿಸುತೇನೆ.

ರೋಗಿಯ ಹೆಸರು ವೈದ್ಯರ ಹೆಸರು

ರೋಗಿಯ ಸಹಿ ವೈದ್ಯರ ಸಹಿ

ಸಾಕ್ಷಿ

ANNEXURE III
STANDARD PROFORMA

TREATMENT GROUP: Group One / Group Two

NAME: HOSPITAL NO:

AGE: D.O.A:

SEX: D.O.S:

OCCUPATION:

ADDRESS:

HISTORY:

PERSONAL HISTORY:

PREOPERATIVE URINARY SYMPTOMS: No/Mild/Moderate/Severe

PAST HISTORY:

Previous history of urinary retention: YES/NO

Previous history of urologic surgery: YES/NO

Previous history of abdominal surgery: YES/NO

DRUG HISTORY:

History of using medication that could interfere with natural voiding function: YES/NO

GENERAL PHYSICAL EXAMINATION:

VITAL SIGNS:

PER ABDOMINAL EXAMINATION:

PER RECTAL EXAMINATION:

CARDIOVASCULAR SYSTEM EXAMINATION:

CENTRAL NERVOUS SYSTEM EXAMINATION:

RESPIRATORY SYSTEM EXAMINATION:

BLOOD INVESTIGATIONS:

URINE ROUTINE

ULTRASONOGRAPHY REPORT:

Residual urine volume:_ _ _

Prostatic volume:_ _ _

DIAGNOSIS:

DRUG TREATMENT (TAMSULOSIN) GIVEN BEFORE 6 HOURS OF SURGERY:YES/NO

SURGERY PERFORMED:

DURATION OF SURGERY: LESS THAN 60 Min / MORE THAN >60 Min

TYPE OF ANESTHESIA: SPINAL / GENERAL / EPIDURAL

POSTOPERATIVE ANALGESIA: Pentazocine / Diclofenac / Paracetamol

TAB. TAMSULOSIN GIVEN AFTER SURGERY: YES / NO

POSTOPERATIVE PAIN: Mild / Moderate / Severe

POSTOPERATIVE FINDINGS:

1) Pain in suprapubic region: YES /NO

2) Inability to pass urine: YES /NO

3) Lower abdominal distention: YES /NO

4) Bladder distention: YES /NO

5) Passage of urine after hot water bag application: YES /NO

6) Passage of urine after encouraging the patient to stand up and walk: YES/NO

7) Requires catheterization: YES/NO.

8) Urine Volume at catheterization: …….

SIDE EFFECTS AFTER SURGERY: YES / NO

KEY TO MASTER CHART

Column Number	Key	Expansion
1	Sl. No	Serial Number
2	T	Tamsulosin
	C	Control
4	M	Male
	F	Female
5	Age	Age in Years
6	H. No	Hospital Number
8	POUS	Pre-Operative Urinary Symptoms
15/16/8	Y	Yes / Present
	N	No / Absent
9	NA	Not Applicable
	PVRU	Post Void Residual Urine
10	HMR	Hemorrhoidectomy
	LIS	Lateral Internal Sphincterotomy
	FIST	Fistulectomy/ Fistulotomy
	Lap. Chol	Laparoscopic Cholecystectomy
11	ml	Milliliters
	POF	Peri-Operative Fluids
12	DOP	Duration of Procedure
13	MOA	Mode of Anesthesia
14	MOD	Moderate

MASTER CHART

MASTER CHART – TAMSULOSIN GROUP																
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
SL.No	**GROUP**	**NAME**	**SEX**	**AGE**	**H.No**	**PROSTATE (GRADE)**	**POUS**	**PVRU**	**PROCEDURE**	**POF**	**DOP**	**MOA**	**POP**	**POUR**	**CATHETERIZATION**	**ADVERSE EFFECTS**
1	T	LALITHA	F	23	202322		N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	GIDDINESS
3	T	RADHAMMA	F	29	203867		N	NA	HMR+LIS	1100	>1 HOUR	SA	MOD	N	N	NIL
5	T	SRINIVAS	M	40	199690	I	N	NA	HMR+LIS	890	>1 HOUR	SA	MOD	N	N	NIL
7	T	MANJULA	F	37	211907	-	Y	<50ml	HMR+LIS	940	<1 HOUR	SA	MOD	N	N	NIL
9	T	MADHUPRAKASH	M	38	216675	II	N	NA	HMR	950	<1 HOUR	SA	MILD	N	N	NIL
11	T	MAJEEDULLA KHAN	M	35	241192	I	N	NA	HMR	920	<1 HOUR	SA	MOD	N	N	NIL
13	T	ARVIND SINGH	M	23	246321	I	N	NA	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
15	T	WILSON ANAND	M	60	201883	II	N	NA	HMR+LIS	990	<1 HOUR	SA	MILD	N	N	NIL
17	T	SUDHA	F	40	254095	-	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	HEADACHE
19	T	YELLESH	M	21	256715	I	N	NA	HMR	900	<1 HOUR	SA	MOD	N	N	NIL
21	T	VENKATESHAPPA	M	66	261141	II	Y	57ml	HMR	960	<1 HOUR	SA	MOD	Y	N	NIL
23	T	KARTHIK	M	23	258558	I	N	NA	HMR	1050	<1 HOUR	SA	MOD	N	N	NIL
25	T	RAHAMATH	M	35	270651	I	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL
27	T	BHRAHMMACHARI	M	46	201178	I	N	NA	HMR	980	<1 HOUR	SA	MOD	N	N	NIL
29	T	KALAVATHI	F	39	278617	-	N	NA	HMR	890	<1 HOUR	SA	MOD	N	N	NIL
31	T	SHABIR PASHA	M	41	278838	I	N	NA	HMR+LIS	960	<1 HOUR	SA	MILD	N	N	NIL
33	T	PRAMILA	F	35	286419	-	N	NA	HMR+LIS	940	<1 HOUR	SA	SEVERE	Y	Y	HEADACHE

35	T	AMBIKA	F	23	289909	-	N	NA	HMR	940	<1 HOUR	SA	MILD	N	N	NIL
37	T	ELEZABETH RANI	F	38	294000	-	N	NA	HMR	980	<1 HOUR	SA	MOD	N	N	NIL
39	T	CHOUDAPPA	M	68	294870	II	Y	<50ml	HMR	1150	>1 HOUR	SA	SEVERE	Y	N	NIL
41	T	SUGANAVATHI	F	39	296943	-	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
43	T	NARAYANAPPA	M	58	301828	II	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
45	T	MUNIRAJU	M	28	302794	I	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
47	T	RAKESH KUMAR	M	32	308248	I	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	HEADACHE
49	T	YASMEEN BANU	F	35	311733	-	Y	<50ml	HMR	1250	<1 HOUR	SA	MILD	N	N	NIL
51	T	SUBBAKKA	F	33	313509	-	N	NA	HMR	960	<1 HOUR	SA	MILD	N	N	NIL
53	T	SHARDHA	F	32	316393	-	N	NA	HMR	1100	<1 HOUR	SA	MOD	N	N	NIL
55	T	JAYARAM REDDY	M	65	325422	III	N	NA	HMR	890	>1 HOUR	SA	MOD	N	N	NIL
57	T	RAGUNATH	M	26	332914	I	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
59	T	MANHAR	M	22	336061	I	N	NA	HMR	950	<1 HOUR	SA	MOD	N	N	NIL
61	T	VENKATASWAMAPPA	M	62	334917	III	N	NA	HMR	920	<1 HOUR	SA	MOD	Y	N	NIL
63	T	GANESH	M	37	345057	I	N	NA	HMR+LIS	980	<1 HOUR	SA	MOD	N	N	GIDDINESS
65	T	ANWAR	M	54	347192	II	Y	<50ml	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
67	T	NARAYANAMMA	F	50	364749	-	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
69	T	RAMAKRISHNAPPA	M	46	373259	I	N	NA	HMR+LIS	900	<1 HOUR	SA	MOD	N	N	HEADACHE
71	T	AFSAR PASHA	M	52	373719	II	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL
73	T	MOHAMMED NAZIM	M	27	374210	-	N	NA	HMR	1050	<1 HOUR	SA	MILD	N	N	NIL
75	T	NAGAPPA	M	46	379260	I	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL
77	T	PAPPIREDDY	M	60	386146	II	N	NA	HMR	980	<1 HOUR	SA	MOD	N	N	NIL
79	T	NARASAMMA	F	50	386191	-	N	NA	HMR	890	<1 HOUR	SA	MOD	N	N	NIL
81	T	LAKSHMIDEVAMMA	F	68	388919	-	Y	72ml	HMR	960	<1 HOUR	SA	MOD	Y	Y	NIL

83	T	KRISHNA REDDY	M	48	389803	I	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
85	T	SHARADHAMMA	F	63	394493	-	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
87	T	RAMAPPA	M	65	401187	III	Y	50ML	HMR	980	<1 HOUR	SA	MOD	Y	N	NIL
89	T	RAMAIAH	M	62	399611	II	N	NA	HMR	1150	<1 HOUR	SA	MOD	N	N	NIL
91	T	SRI RAMAPPA	M	55	401187	I	Y	66ml	HMR	960	<1 HOUR	SA	MOD	Y	N	NIL
93	T	KOUSER TAJ	F	30	407592	-	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
95	T	GOVINDAPPA	M	58	386557	II	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
97	T	SRINIVAS	M	55	358528	II	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	GIDDINESS
99	T	MANJUNATH REDDY	M	31	412532	-	N	NA	HMR	910	<1 HOUR	SA	MOD	N	N	NIL
101	T	MOHAMAD AZAM	M	60	407995	II	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL
103	T	VENKATARAMAPPA	M	65	406481	III	Y	<50ml	HMR	980	<1 HOUR	SA	MOD	Y	Y	NIL
105	T	SHANKAR	M	29	439432	-	N	NA	HMR	890	<1 HOUR	SA	MOD	N	N	NIL
107	T	PREMCHETHAN	M	22	443114	I	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL
109	T	NAGARAJ	M	36	444745	-	N	NA	HMR	940	<1 HOUR	SA	MILD	N	N	NIL
111	T	ASHA	F	51	446012	-	N	NA	HMR	940	<1 HOUR	SA	MILD	N	N	NIL
113	T	NARESH	M	30	453328	-	N	NA	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
115	T	SUSHMA	F	21	422032	-	N	NA	HMR	890	<1 HOUR	SA	MOD	N	N	NIL
117	T	MANJULA	F	55	415013	-	N	NA	HMR	940	<1 HOUR	SA	MILD	N	N	NIL
119	T	SRINIVAS	M	55	464111	II	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
121	T	CHIKAMUNIYAPPA	M	68	474401	III	Y	<50ml	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
123	T	NAGESH	M	40	475293	I	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
125	T	JANHAVI	F	25	410906	-	N	NA	LAP CHOL+HMR	1350	>1 HOUR	GA	MOD	Y	Y	NIL
127	T	DODDAVERANNA	M	56	485309	II	N	NA	HMR	950	<1 HOUR	SA	MILD	N	N	NIL

MASTER CHART – CONTROL GROUP																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SL.No	GROUP	NAME	SEX	AGE	H.No	PROSTATE (GRADE)	POUS	PVRU	PROCEDURE	POF	DOP	MOA	POP	POUR	CATHETERIZATION	ADVERSE EFFECTS
2	C	ANAND KUMAR	M	28	202953	-	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
4	C	MUNIRATHNAMMA	F	56	205934	-	Y	<50ml	HMR	970	<1 HOUR	SA	MOD	Y	N	NIL
6	C	SUMITHRAMMA	F	54	211528	-	N	NA	HMR	920	<1 HOUR	SA	MOD	N	N	NIL
8	C	VENKATESH	M	28	206415	-	N	NA	HMR	960	<1 HOUR	SA	MOD	Y	N	NIL
10	C	AFROZULLA KHAN	M	36	197126	I	N	NA	HMR	890	<1 HOUR	SA	MOD	N	N	NIL
12	C	SONAMMA	F	60	184435	-	Y	<50ml	HMR	1200	>1 HOUR	SA	MOD	Y	Y	NIL
14	C	RAMESH	M	58	225056	II	Y	NA	HMR	1000	<1 HOUR	SA	MOD	Y	Y	NIL
16	C	NARAYANAMMA	F	69	252054	-	N	NA	HMR	860	<1 HOUR	SA	MOD	N	N	NIL
18	C	GANGADHAR	M	50	255865	I	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
20	C	VINAY KUMAR	M	33	257097	-	N	NA	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
22	C	ABDUL KHUDDUB	M	52	202557	I	Y	<50ml	HMR	1100	<1 HOUR	SA	MOD	N	N	NIL
24	C	JAGADISH	M	36	267105	-	N	NA	HMR+ FIST	1150	>1 HOUR	SA	SEVERE	Y	Y	HEADACHE
26	C	NARASIMHAPPA	M	57	271077	II	Y	62ml	HMR	920	<1 HOUR	SA	MOD	Y	N	NIL
28	C	RAMU	M	26	277395	-	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
30	C	RAVIKUMAR	M	33	270693	-	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
32	C	GIRISH KUMAR	M	27	279949	-	N	NA	HMR + FIST	1250	>1 HOUR	SA	MOD	Y	N	NIL
34	C	VINAY KUMAR	M	25	292499	-	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
36	C	PEDDAPAIAH	M	51	294472	II	Y	<50ml	HMR	900	<1 HOUR	SA	MOD	Y	N	NIL
38	C	IMRAN PASHA	M	26	293324	-	N	NA	HMR	1050	>1 HOUR	SA	MOD	Y	N	NIL
40	C	VISHAL REDDY	M	19	296106	-	N	NA	HMR	950	<1 HOUR	SA	MOD	N	N	NIL
42	C	MANJUNATH	M	32	296902	-	N	NA	HMR	960	<1 HOUR	SA	MOD	N	N	NIL

44	C	BHAGYALAKSHMI	F	28	304831	-	Y	<50ml	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
46	C	LAKSHMAIAH	M	68	302406	II	N	NA	HMR	980	<1 HOUR	SA	MILD	Y	Y	NIL
48	C	CHIKAMUNIYAPPA	M	46	308369	I	N	NA	HMR	960	<1 HOUR	SA	MILD	N	N	NIL
50	C	RATHNAMMA	F	57	310615	-	Y	<50ml	HMR	940	<1 HOUR	SA	MILD	N	N	NIL
52	C	MUNIYAMMA	F	54	305655	-	N	NA	HMR	940	<1 HOUR	SA	MILD	N	N	GIDDINESS
54	C	NAGMA SULTANA	F	36	321038	-	N	NA	HMR	970	<1 HOUR	SA	MILD	N	N	NIL
56	C	ARIF PASHA	M	30	329751	-	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
58	C	MANJU	M	29	333781	I	N	NA	HMR	960	<1 HOUR	SA	MILD	N	N	NIL
60	C	PALANIVELU	M	48	327413	I	N	NA	HMR	890	<1 HOUR	SA	MILD	N	N	NIL
62	C	BANGARAPPA	M	63	315761	II	Y	<50ml	HMR	970	<1 HOUR	SA	MILD	N	N	NIL
64	C	MANJULA	F	41	346846	-	N	NA	HMR+LIS	1000	<1 HOUR	SA	MILD	N	N	NIL
66	C	RADHA	F	32	353805	-	N	NA	HMR	860	<1 HOUR	SA	MOD	N	N	NIL
68	C	BALAJI PRASAD	M	34	305506	I	N	NA	HMR	940	<1 HOUR	SA	SEVERE	Y	Y	NIL
70	C	PUSHPA	F	38	370506	-	N	NA	HMR+LIS	980	<1 HOUR	SA	SEVERE	Y	Y	NIL
72	C	AMBIKA	F	40	377257	-	N	NA	HMR+LIS	930	<1 HOUR	SA	MILD	N	N	NIL
74	C	CHINNAPPA	M	65	372465	II	Y	58ml	HMR	910	<1 HOUR	SA	MOD	Y	Y	NIL
76	C	RAMESH	M	47	385392	I	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL
78	C	GOVINDAPPA	M	48	386557	I	N	NA	HMR	990	<1 HOUR	SA	MILD	Y	Y	NIL
80	C	GEETHA	F	28	387524	-	N	NA	HMR	990	<1 HOUR	SA	MOD	Y	Y	NIL
82	C	ANAND	M	28	389990	I	N	NA	HMR	930	<1 HOUR	SA	MILD	N	N	NIL
84	C	SUDHARSHAN	M	21	392766	I	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
86	C	SUBBRAYAPPA	M	62	395958	III	Y	73ML	HMR	970	<1 HOUR	SA	MILD	Y	Y	NIL
88	C	MUNIYAPPA	M	30	337413	I	N	NA	HMR	1050	<1 HOUR	SA	MOD	N	N	NIL
90	C	KEMPE GOWDA	M	51	405411	I	N	NA	HMR	970	<1 HOUR	SA	MILD	N	N	NIL
92	C	MURALIDHARA	M	28	405651	I	N	NA	HMR	910	<1 HOUR	SA	MILD	N	N	NIL
94	C	BASAVE GOWDA	M	55	402468	II	N	NA	HMR	1000	<1 HOUR	SA	MILD	N	N	NIL
96	C	RAVI	M	35	408048	I	N	NA	HMR	980	<1 HOUR	SA	SEVERE	Y	Y	NIL

98	C	JYOTHILAKSHMI	F	43	375500	-	N	NA	HMR+LIS	960	<1 HOUR	SA	MOD	Y	N	NIL
100	C	SHAMASULTANA	F	22	413177	-	N	NA	HMR	940	<1 HOUR	SA	MOD	N	N	NIL
102	C	JAYAMMA	F	55	431702	-	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
104	C	CHANDRAPPA	M	56	436572	I	N	NA	HMR	990	<1 HOUR	SA	MOD	N	N	NIL
106	C	VINAYAK	M	24	441169	I	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
108	C	NARAYANAPPA	M	65	440569	II	N	NA	HMR	940	<1 HOUR	SA	MILD	Y	N	NIL
110	C	AMBARISH	M	19	446325	I	N	NA	HMR	990	<1 HOUR	SA	MILD	N	N	NIL
112	C	BANGARAPPA	M	50	451860	II	N	NA	HMR	900	<1 HOUR	SA	MOD	N	N	NIL
114	C	MUNIYAPPA	M	55	455597	II	Y	64ML	HMR	1050	<1 HOUR	SA	SEVERE	Y	Y	NIL
116	C	VENKATRAMAPPA	M	34	461895	I	N	NA	HMR	950	<1 HOUR	SA	MILD	N	N	NIL
118	C	VENKATRAMAPPA	M	30	463444	I	N	NA	HMR	980	<1 HOUR	SA	SEVERE	Y	Y	NIL
120	C	HABIB KHAN	M	26	472646	I	N	NA	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
122	C	CHANDRA REDDY	M	45	475263	I	N	NA	HMR	980	<1 HOUR	SA	MILD	N	N	NIL
124	C	NASEEMA	F	21	478924	I	N	NA	HMR	930	<1 HOUR	SA	MILD	N	N	NIL
126	C	SOMANNA	M	65	480881	II	Y	<50ml	HMR	940	<1 HOUR	SA	MOD	Y	Y	NIL
128	C	MANJULA	F	38	487171	-	N	NA	HMR	920	<1 HOUR	SA	MILD	N	N	NIL