PROSTATIC HYPERPLASIA

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Abstract: Prostatic hyperplasia (PH) is a noncancerous enlargement of the prostate gland that may restrict the flow of urine from the bladder. Prostatic hyperplasia (PH) is associated with aging in men. The mechanism by which the prostate obstructs the urinary flow is thought to be partly due to a mechanical "Static" effect caused by the bulk of the prostatic tissue and partly to a "dynamic" muscular component. All of the patients suffering from symptomatic prostatic hypertrophy (PH) should be monitored by the I-PSS. Medical management of PH currently revolves around two groups of drugs; 5 alpha reductase inhibitors. Alpha adrenoceptor blockers[12]. It is the gold standard surgical treatment for prostatic hyperplasia now a days.

Key words: Prostatic hyperplasia, TURP, IPSS, X-Bladder.

Prostatic hyperplasia (PH) is a noncancerous enlargement of the prostate gland that may restrict the flow of urine from the bladder.

It is a part of normal aging process. Some patients present at earlier age than others. Prostatic hyperplasia (PH) is one of the most common urological ailments which require hospital admission.

INCIDENCE AND EPIDEMIOLOGY

It constitutes 38% of the total load in a urology unit in Pakistan[1].

Prostatic hyperplasia (PH) is associated with aging in men. At autopsy the hyperplastic changes are noted in 40% of men in their 50's and 70% of those in their 60's[2].

A man of 40 years has a 30%-40% chance of surgical intervention for PH if he survives upto the age of 80 years[3].

Prostatic hyperplasia (PH) is a common problem that affects the quality of life (QOL) in approximately one third of men older than 50 years. PH is histologically evident in up to 90% of men by age 85 years.

RELEVANT ANATOMY

The normal prostate volume in a young adult is approximately 20 g.

The prostate is a walnut-sized gland that forms part of the male reproductive system. The gland is composed of several regions or lobes that are enclosed by an outer layer of tissue (capsule). The different zones include the peripheral, central, anterior fibromuscular stroma, and transitional. PH originates in the transitional zone, which surrounds the

Article Citation: Tahir S, Prostatic Hyperplasia. Indep Rev Jan-Jun 2018;20(1-6): 32-47.

Date received: 16/09/2017
Date Accepted: 22/11/2017

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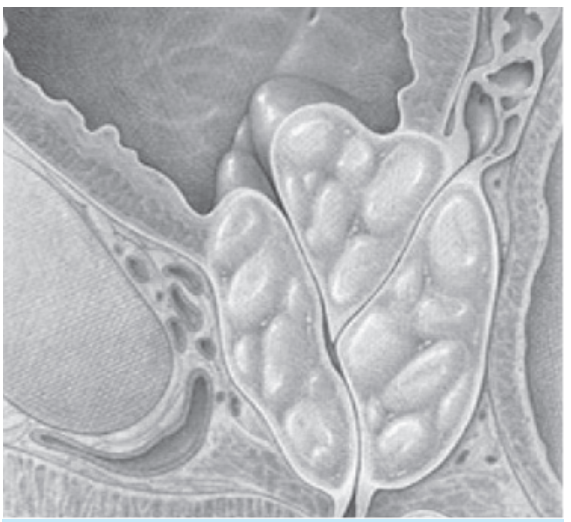
urethra. Microscopically, PH is characterized as a hyperplastic process. The number of cells in the gland increases with age. As the gland enlarges, it may cause increased resistance to urine flow through the urethra over time, resulting in clinical manifestations of prostatic hyperplasia (PH). The prostate enlarges with age in a hormone dependent manner. Castrated males do not develop prostatic hyperplasia (PH).

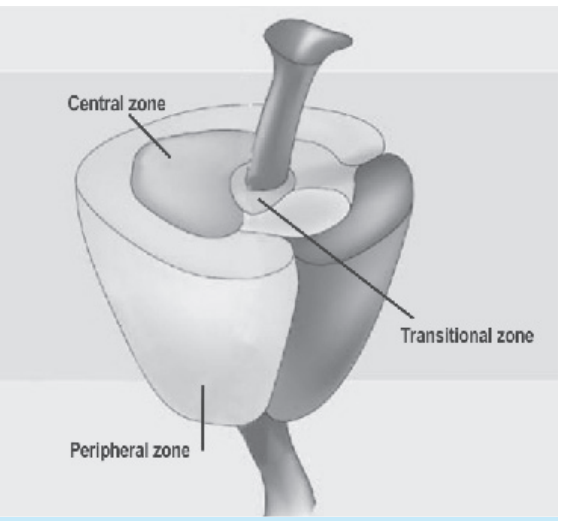


Enlarged prostate

The prostate is located in front of the rectum and just below the urinary bladder. It can be examined or felt by inserting a gloved finger into the rectum. Only the posterior superficial surface of the gland can be examined by this way. For a short distance, the prostate surrounds the urethra, the tube that carries urine from the bladder to the outside of the body.

FUNCTION OF PROSTATE GLAND

Its main function is primarily secretory; it produces alkaline fluid that comprises approximately 70% of the seminal volume. It is a conduit for semen to pass, and it prevents retrograde ejaculation (ejaculation resulting in semen being forced backwards into the bladder) by closing off the bladder neck during sexual climax. The fluid (semen) helps to neutralize the acidic vaginal environment and provides carbohydrates and nutrients for the sperm. Ejaculation involves a coordinated contraction of many different components, including the smooth muscles of the seminal vesicles, vasa deferentia, ejaculatory ducts, and the ischiocavernosus and bulbocavernosus muscles.

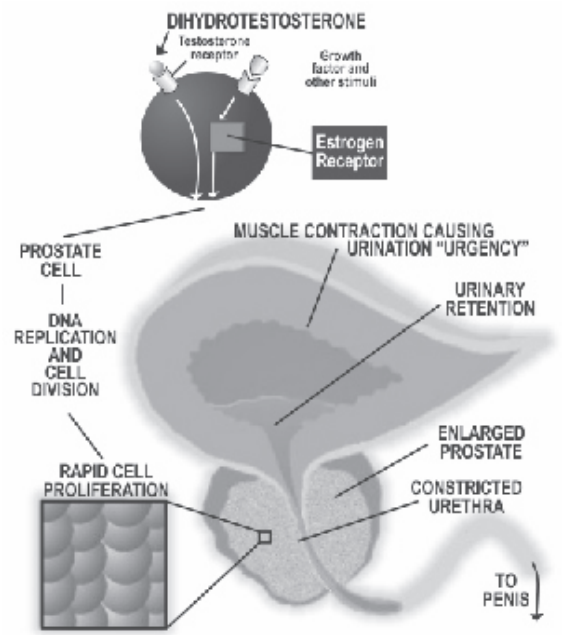


Anatomical zones of prostate glands

The prostate produces lubrication and nutrition for sperm. It also adds alkaline fluid to the ejaculate, resulting in liquefaction. The prostate rests just below the bladder, as a collar around the urethra.

PATHOGENESIS

Prostatic hyperplasia (PH) is a proliferative process of the cellular elements of the prostate (ie, an enlarged prostate). Cellular accumulation and gland enlargement may be due to epithelial and stromal proliferation, impaired preprogrammed cell death (apoptosis), or both.

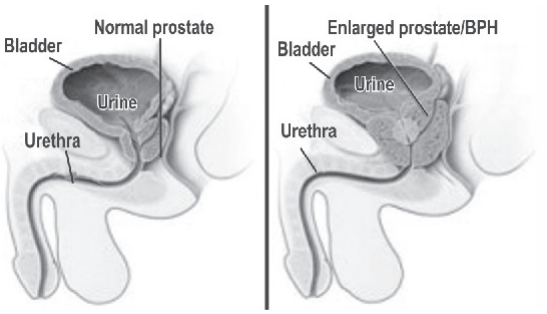


Pathogenesis of prostatic hyperplasia

MECHANISM OF HYPERPLASIA

With regard to the prostate, PH is characterized by a varying combination of epithelial and stromal hyperplasia. Some patients demonstrate an almost pure smooth muscle proliferation, although most demonstrate a fibroadenomyomatous pattern of hyperplasia. Prostatic enlargement depends on the potent androgen 5-alpha DHT. In the prostate gland, type II 5-alpha reductase metabolizes circulating testosterone into DHT (works locally, not systemically). DHT binds to androgen receptors in the cell nuclei; this can result in prostatic hyperplasia (PH).

Large numbers of alpha-1 adrenergic receptors are located in the smooth muscle of the stroma and capsule of the prostate, as well as in the bladder neck. Stimulation of these receptors causes an increase in smooth muscle tone, which can worsen LUTS. Blockade of these receptors can reversibly relax these muscle, with subsequent relief of LUTS.



Mechanism of obstruction

MECHANISM OF OBSTRUCTION

The mechanism by which the prostate obstructs the urinary flow is thought to be partly due to a mechanical "Static" effect caused by the bulk of the prostatic tissue and partly to a "dynamic" muscular component resulting from stimulation of adrenergic alpha receptors in the prostatic fibromuscular stroma, capsule and bladder neck. The relative importance of these two factors is still disputed[10,11].

Obstruction leads to bladder smooth muscle cell hypertrophy. Biopsy specimens of trabeculated bladders demonstrate evidence of scarce smooth muscle fibers with an increase in collagen. The collagen fibers limit compliance, leading to higher bladder pressures with filling. In addition, their presence limits shortening of adjacent smooth muscle cells, leading to impaired emptying and the development of residual urine.

Prostatic hyperplasia (PH) involves both the stromal and epithelial elements of the prostate arising in the periurethral and transition zones of the gland: It is hormone dependent on testosterone and dihydrotestosterone

(DHT) production. An estimated 50% of men demonstrate histopathologic Prostatic hyperplasia (PH) by age 60 years. This number increases to 90% by age 85 years; thus, increasing gland size is considered a normal part of the aging process.

Approximately half of those diagnosed with histopathologic Prostatic hyperplasia (PH) demonstrate moderate-to-severe LUTS. Clinical manifestations of LUTS include urinary frequency, urgency, nocturia (getting up at night during sleep to urinate), decreased or intermittent force of stream, or a sensation of incomplete emptying. Complications occur less commonly but may include acute urinary retention, impaired bladder emptying, or the need for surgery.

Prostate volume may increase over time in men with Prostatic hyperplasia (PH). In addition, peak urinary flow, voided volume, and symptoms may worsen over time in men with untreated prostatic hyperplasia (PH). The risk of acute urinary retention and the likelihood that PH-related surgery necessarily increases with age.

The traditional theory is that as the prostate enlarges, the surrounding capsule prevents it from readily expanding, and this subsequently results in urethral compression. The notion that clinical symptoms are simply due to mass-related increases in urethral resistance is too simplistic. Current thinking holds that obstruction-induced bladder dysfunction contributes significantly to symptoms. The bladder wall becomes thickened, trabeculated, and irritable when it is forced to hypertrophy and increase its own contractile force. This increased sensitivity (detrusor instability), even with small volumes of urine in the bladder, is believed to cause ensuing urinary frequency and LUTS. The bladder may gradually weaken and lose the ability to empty completely, thus leading to increased residual urine volume and, sometimes, acute or chronic urinary retention.

The voiding dysfunction that ensues from prostate gland enlargement and bladder outlet obstruction (BOO) has been generically termed lower urinary tract symptoms (LUTS). It has also been commonly referred to as prostatism, although this term has decreased in popularity. These entities overlap; not all men with prostatic hyperplasia (PH) have LUTS, and, likewise, not all men with LUTS have PH. The same can be said for BOO.

The common presenting features of prostatic hyperplasia are divided into two groups to gauge the severity of prostatic symptoms.

PRESENTATIONS

OBSTRUCTIVE SYMPTOMS

- Hesitancy
- Intermittancy
- Terminal dribbling
- Poor stream
- Sensation of incomplete emptying

IRRITATIVE SYMPTOMS

- Nocturia
- Frequency
- Urgency
- Dysuria

URINARY URGENCY

The sudden urgent need to urinate quickly

The sensation of imminent loss of urine without control

HESITANCY

Hesitant, interrupted, weak urinary stream.

Difficulty initiating the urinary stream. Having to stand at or sit on the toilet for some time prior to producing a urinary stream.

INCOMPLETE BLADDER EMPTYING

The sensation of incomplete evacuation of urine from the bladder . The feeling of persistent residual urine regardless of the frequency of urination.

STRAINING

The need to strain or push (Valsalva maneuver) to initiate and maintain urination in order to more fully evacuate the bladder.

DECREASED FORCE OF STREAM

The subjective loss of force of the urinary stream over time.

DRIBBLING OR DRIPPING

The loss of small amounts of urine due to a poor urinary stream.

CLINICAL HISTORY

Special attention to the onset and duration of symptoms, general health issues (including sexual history), fitness for any possible surgical intervention, severity of symptoms and how they are affecting QOL, medications, and previously attempted treatments is essential to making the correct diagnosis.

Medical history should be taken to qualify and quantify voiding dysfunction. This is the mainstay of evaluation. Identification of other medical comorbidities is essential to properly assess the condition and to determine conditions that may complicate treatment.

FREQUENCY

Approximately 30 million men have symptoms related to this benign enlargement worldwide. The need to urinate frequently during the day or night (nocturia), usually voiding only small amounts of urine with each episode Interrupted sleep to urinate at night.

CLINICAL EXAMINATION

Focused physical examination and a neurologic examination is performed. It also includes DRE to assess the presence of locally advanced prostate cancer and to determine gross prostate size. The neurological examination is geared toward lower-extremity neurologic and muscular function, as well as anal sphincter tone. Examination of the phallus and foreskin occasionally reveals meatal stenosis, unretractable foreskin, penile ulcers, or foreign bodies such as warts.

FOCUSED PHYSICAL EXAMINATION

It is performed to assess the suprapubic area for signs of bladder distention and neurological examination for overall sensory and motor deficits.

DIGITAL RECTAL EXAMINATION (DRE)

The prostate is examined using the index finger of the dominant hand. The finger is placed through the anus after relaxation of the anal sphincter, and the prostate is palpated circumferentially.

The digital rectal examination (DRE) is an integral part of the evaluation for men with presumed prostatic hyperplasia (PH).

During this portion of the examination, prostate size and contour can be assessed, nodules can be evaluated, and areas suggestive of malignancy can be detected.

A more precise volumetric determination can be made using transrectal ultrasonography (TRUS).

Assessment of pelvic floor tone, the presence or absence of fluctuance (ie, prostate abscess), and pain sensitivity of the gland (prostatodynia) can be assessed.

INTERNATIONAL PROSTATIC SYMPTOM SCORING

All of the patients suffering from symptomatic prostatic hypertrophy (PH) should be monitored by the I-PSS and quality of life assessment not only during the initial treatment but also during and after treatment. This would allow for monitoring of the response to treatment. Therefore basic initial evaluation of patients with symptoms suggestive of prostatism is mandatory.

Prostate Symptom Score (I-PSS), diagnostic criteria and treatment options are standardized by the International Census Committee (ICC)4. Each symptom is graded into numbers such as ;

Prostatic symptoms score is designed for self assessment by the patient, who must select one of the six options offered for each question, indicating the severity of the particular symptom.

Similarly to assess the quality of life of a patient with symptomatic prostatic hyperplasia (PH), the patient is asked how he would feel if he had to spend the rest of his life with his urinary condition just the way he felt now.

	Not at all	Lessthan 1 time in 5	Less Than Half the time	About half the time	More than half the time	Almost always
Over the past month or so, how often have your had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5
Over the past month or so, how often have you had to urinate again less than two hours after you finished urinating?	0	1	2	3	4	5
Over the past month or so, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5
Over the past month or so, how often have you found it difficult to postpone urination?	0	1	2	3	4	5
Over the past month or so, how often have you had a weak urinary stream?	0	1	2	3	4	5
Over the past month or so, how often have you had to push or strain to begin urination?	0	1	2	3	4	5

Over the last month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?

None = 0 - 1 Time = 1 - 2 Time = 2 - 3 Time = 3 - 4 Time = 4 - 5 Time = 5 - Total Score 0-35

QUALITY OF LIFE ASSESSMENT

If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about feel?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible
0	1	2	3	4	5	6

Patient scores his answer from "0" to "6" with a score.

QUALITY OF LIFE ASSESSMENT

1	Occurs in less than 20% of attempts to void.
2	Occurs in less than 20%-50% of attempts to void.
3	More than 50% but not always.
4	Always.
0	Showing that he would be delighted and a score of
6	Indicating that he would be "terrible".

Symptoms often attributed to prostatic hyperplasia (PH) can be caused by neurogenic bladder, carcinoma in situ of the bladder, foreign bodies in the bladder (stones or retained stents), urethral stricture from trauma or sexually transmitted disease, cystitis, and prostatitis.

Other condition causing symptoms of bladder out flow obstruction are;

- Bladder Cancer
- Bladder Stones
- Bladder Trauma
- Chronic Pelvic Pain
- Interstitial Cystitis
- Neurogenic Bladder
- Prostatitis, Bacterial
- Prostatitis, Tuberculous
- Radiation Cystitis
- Urethral Strictures
- Urinary Tract Infection

Precise assessment of the patients with prostatic problem is done with international symptom scoring. It helps to plan an effective treatment modality.

The differential diagnosis of prostatic hyperplasia (PH), in which bladder outlet obstruction (BOO) must be differentiated from lower urinary tract symptoms (LUTS), includes prostate cancer, prostatic abscess, acute and chronic prostatitis, pelvic floor dysfunction, detrusor hyperreflexia, and detrusor sphincter dyssynergia.

MORTALITY/MORBIDITY

Chronic end-stage BOO often leads to renal failure and uremia. While this complication is much less common now, chronic BOO secondary to Prostatic hyperplasia (PH) may lead to urinary retention, renal insufficiency, recurrent urinary tract infections, gross hematuria, and bladder calculi.

URINE EXAMINATION

The urine is examined using dipstick methods and/or via centrifuged sediment evaluation to assess for the presence of blood, leukocytes, bacteria, protein, or glucose.

URINE CULTURE

It may be useful to exclude infectious causes of irritative voiding and is usually performed if the initial urinalysis findings indicate an abnormality.

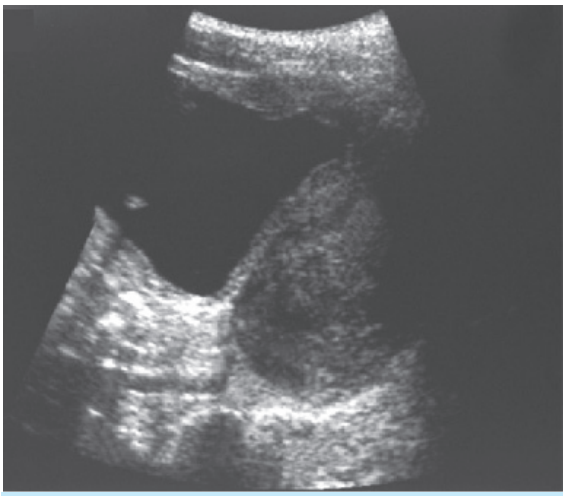
PROSTATE-SPECIFIC ANTIGEN (PSA)

Although prostatic hyperplasia (PH) does not cause prostate cancer, men in the age range for PH are at risk for cancer and should be screened accordingly. Men with large size prostate may have slightly higher PSA levels. The risks and benefits of screening PSA levels are discussed with the patient.

ELECTROLYTES, BUN, AND CREATININE

These evaluations are useful screening tools for chronic renal insufficiency if patients have high postvoid residual urine volumes. A routine serum creatinine measurement is

not indicated in the initial evaluation of men with lower urinary tract symptoms (LUTS) secondary to prostatic hyperplasia (PH).



Enlarged prostate (Ultrasound scan)

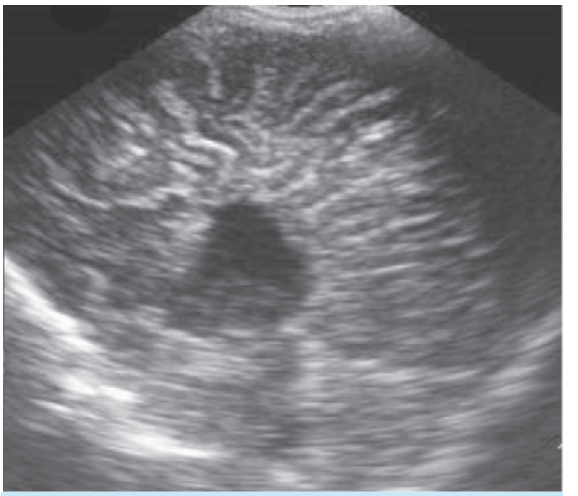
ULTRASONOGRAPHY

Ultrasound examination is useful for helping determine bladder and prostate size and the degree of hydronephrosis (if any) in patients with urinary retention or signs of renal insufficiency. Generally, they are not indicated for the initial evaluation of a patient with uncomplicated LUTS.

Imaging of the prostate using TRUS is re-commended in selected patients. The success of certain minimally invasive treatments may depend on the anatomical characteristics of the gland.

For patients with elevated PSA levels, a TRUS-guided biopsy may be indicated.
Imaging of the upper tracts is indicated if patients present with concomitant hematuria, history of urolithiasis, elevated creatinine level, high postvoid residual volume, or history of upper urinary tract infection.

Other diagnostic studies, such as CT scanning or MRI, have no role in the evaluation and treatment of patients with uncomplicated PH.



Bladder outflow obstruction (Ultrasound scan)

URODYNAMICS

The symptoms of bladder outflow obstruction are not specific, therefore, uroflowmetery and assessment of residual urine of every patient with symptomatic PH should be done. Pressure flow studies, serum prostatic specific antigen, imaging studies and endoscopy of the lower urinary tract should also be performed[4]. The mandatory diagnostic tests for prostatism are only two ;

- Uroflowmetery.
- Residual urine estimation.

It has been demonstrated that a peak flow rate of less than 10 ml per second is definite evidence of bladder outflow obstruction. Flow rate of 10-15 ml per second is a border line case and more than 15 ml per second, the patient has no outflow obstruction[5,6].

Uroflowmetery cannot be used exclusively to diagnose intravesical obstruction. Similar is the problem with residual urine.

Flow rate is useful in the initial assessment and to help determine the response to treatment. It should be performed prior to embarking on any active treatments, including medical treatment.

Maximal flow rate (Qmax) is the single best measurement, but a low Qmax does not help differentiate between obstruction and poor bladder contractility. For more detailed analysis, a pressure flow study is required. A Qmax value of greater than 15 mL/s is considered by many to be normal. A value of less than 7 mL/s is widely accepted as low.

The results of flow rate measurements are somewhat effort- and volume-dependent; therefore, the best plan to make a reasonable determination of significance is to obtain at least 2 tracings with at least 150 mL of voided volume each time.

POSTVOID RESIDUAL (PVR) URINE

Obtain this value as soon after voiding as possible to gauge the severity of bladder decompensation.
It can be obtained invasively with a catheter but is best determined noninvasively with a transabdominal ultrasonic scanner.

A high PVR (eg, 350 mL) may indicate bladder dysfunction and may predict a negative response to treatment.

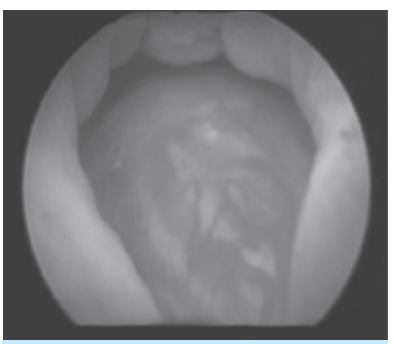
Patients are selected for surgery with residual urine between 60mls to 200 mls8,9. There is a wide variation in range (60 to 200 ml) and no cut off line can be established. The residual urine may originate from conditions other than bladder outflow obstruction. Patients with marked prostatic symptoms may present without residual urine[7,8].

Residual urine volume may vary widely in the same patient on repeated measurements and the volume does not correlate with the degree of obstruction as judged by symptoms, urodynamic studies and cystoscopy[9].

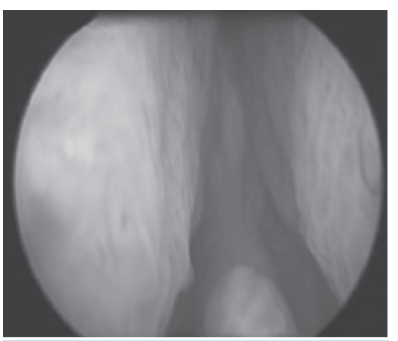
PRESSURE FLOW STUDIES

Although these tests are somewhat invasive, requiring catheterization of the urethra and placement of a transrectal pressure transducer, the findings are invaluable for determining the presence of bladder outlet obstruction (BOO), especially prior to any invasive therapy.

Urodynamic studies are the only way to help distinguish patients with poor bladder contraction ability (detrusor underactivity) from those with outlet obstruction.



Enlarged median lobe of prostate (Urethro cystoscopy)



Enlarged lateral lobes of prostate (Urethro cystoscopy)

Flexible urethro cystoscope

BOO is characterized by high intravesical voiding pressures (>60 cm water) accompanied by low urine flow rates (Qmax <15 mL/s).

URINE CYTOLOGY

Cytologic examination of the urine may be considered in patients with predominantly irritative voiding symptoms. Risk factors for bladder cancer (smoking, previous bladder cancer) should alert the physician to consider this noninvasive test.

PROCEDURES

URETHRO CYSTOSCOPY

Endoscopy of the lower urinary tract is;
Performed in patients in whom a foreign body or malignancy is suspected.

Prolonged catheterization, or trauma; findings may suggest urethral stricture as the cause of BOO, instead of BPH.

Flexible cystoscopy can be easily performed in several minutes in an office-based setting using topical gel-based intraurethral anesthesia without sedation.

Both medical and surgical modalities can help patients with prostatic hyperplasia.

There are various factors which affect the type of treatment modality offered to the patients with symptomatic prostatic hyperplasia (PH). These are as under;

- General health of the patient.
- Patient's symptom score.
- The size of the patient's prostate.
- The results of examination and investigations.
- The type of facility available in the hospital.
- And the surgeon's own expertise.

Previously the surgical intervention was the mainstay of treatment for prostatic hyperplasia (PH).

Recently medical therapy and other minimally invasive procedures are being applied for the symptomatic management of prostatic hyperplasia (PH). The long term results are still not available and therefore superiority of either treatment can not be yet established.

There are three main options for treatment of prostatic hyperplasia. Which are following;

- Watchful waiting
- Medical management
- Surgical management

WATCHFUL WAITING

When patient score less than 9 on IPSS and they have no signs of complications secondary to prostatic hyperplasia, watchful waiting is safe. During this patient is regularly monitored for urinary flow rates and post void residual urine. Any deviation from normal levels would lead to review of management plan.

MEDICAL MANAGEMENT

Medical management of PH currently revolves around two groups of drugs ;

- 5 alpha reductase inhibitors
- Alpha adrenoceptor blockers[12].

5 ALPHA REDUCTASE INHIBITORS

Testosterone is essential for the development and maintenance of the prostate. In addition, oestrogens, which increase the number of androgen receptors, may enhance the development of prostatic hyperplasia (PH)[13].

Previously LHRH analogues, androgens, estrogens and antiandrogens, alone or in combination were used with equivocal

results14. Recently, 5 alpha reductase inhibitors which block the enzyme responsible for the conversion of testosterone to the more active dihydrotestosterone (DHT) have been described[15].

Circulating DHT levels can be suppressed by 80%-92% within a week in patients receiving 5 alpha reductase inhibitors[16]. After only 3 months of treatment, prostate volume can be decreased by 18%.

After a full six months of treatment, continued shrinkage occurs, leading to a 27% reduction in size. 5 alpha reductase inhibitor (fina-steroid) is available by the name of "Proscar"[17].

Finasteride (Proscar) decreases the prostatic size and thus reduces the prostatic obstruction by decreasing the static component of obstruction. But these should be advised only in early or even for bothersome prostatic symptoms due to prostatic hyperplasia (PH) but not in cases where surgery is absolutely indicated18. The recommended dose is 5 mg/day probably for one year[19].

ALPHA BLOCKERS

Alpha blockade has been the mainstay of treatment aimed at reducing the prostatic muscular tone and thus the "dynamic" component of the prostatic obstruction.

The first alpha blocker used was phenoxybenzamine which non selectively blocked both alpha and alpha-2 receptors with high incidence of side effects[20,21].

Prazosin, terzosin and indoramin are recent addition and exert selective alpha-1 blockade with fewer side effects22,23. Approximately 70% of patients receiving alpha blockers can be expected to obtain symptomatic relief24. Like fina-steroid, the alpha blockers should be tried only in patients with prostatic symptoms without absolute indications for prostatectomy.

SURGICAL MANAGEMENT

The common indications for surgical intervention are;

- Prostatism (90.7%).
- Significant residual urine (34.4.%).
- Acute urinary retention (27.1%).
- Recurrent urinary tract infection (12.3%)
- Haematuria (12%).
- Altered urodynamic function (9.9%).
- Renal insufficiency (4.5%)
- Bladder stones (3.0%).

Surgical treatment can be divided in to 3 groups.

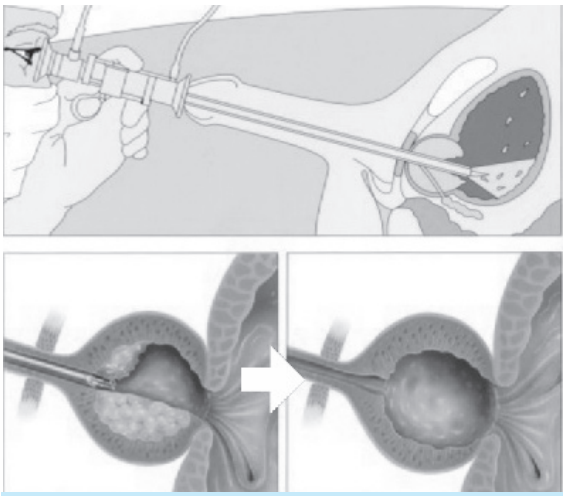
- Endoscopic surgery
- Open surgery
- Minimally invasive methods

In the presence of significant obstructive symptoms, the treatment modality should be decided on the patient's general health and acceptability. If the patient is unfit for surgery, prostatic Stents may be the answer. If the patient is fit for surgery, TURP is the preferred option provided the facility and the trained surgeon is available otherwise one has to go for open prostatectomy.

In comparatively young patients who want to retain antegrade ejaculation, TUIP is a good alternative provided the adenoma is less than 35 gm.

Whatever the treatment modality is applied, patient should be monitored post-operatively with subjective prostatic symptoms, digital

rectal examination, PSA estimation and uroflowmetery if indicated.



TURP

ENDOSCOPIC SURGERY

It is the gold standard surgical treatment for prostatic hyperplasia now a days. Following methods are in practice;

- TURP (Trans urethral resection of prostate)
- TUIP (Trans urethral incision of prostate)
- TULIP (Trans urethral laser induced prostatectomy)
- TUNA (Trans urethral needle ablation)

TRANS URETHRAL RESECTION OF PROSTATE (TURP)

It is the most common procedure performed for symptomatic prostatic hyperplasia(PH)[25,26]. The ideal resection rate is 1 gram/minute where 40-60 gms adenoma can be resected uneventfully[27]. TURP is being done in 90% of cases[29]. Trend is increasing in favour of TURP. Chances of wound infection, thromboembolism and prolonged. Though TURP is the golden therapy but it is not without hazards. It has mortality rate of 0.2% to 1% and morbidity rate of 18%[25,28].

The different postoperative complications noted are;

- Failure to void (6.5%)
- Postoperative bleeding (3.9%).
- Clot retention (3.3%).
- Infection (2.33%).
- Vesical neck contracture (2.7%).
- Urethral stricture (2.5%).
- Mild stress incontinence (1.2%).
- Significant incontinence in (0.5%) cases[29].
- The incidence of erectile dysfunction after TURP has been reported as 4 to 40%[30].
- Re-resection of prostate after TURP. 4% of patients require re-resection for benign disease[31].

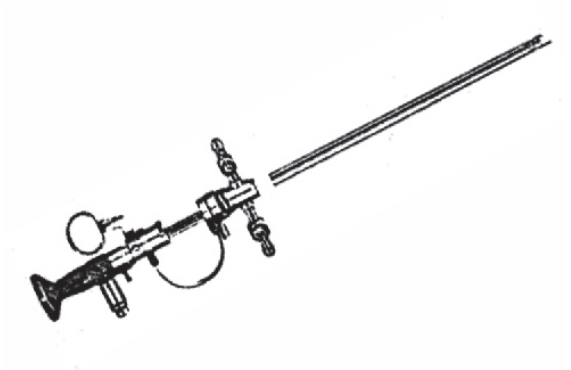
With all these hazards, the TURP is still less invasive as compared to open prostatectomy.

TRANSURETHRAL INCISION OF PROSTATE (TUIP)

Transurethral incision of the prostate has been used for quite sometime. It not as an alternative to transurethral resection of prostate. It is need in selective number of patients with small prostates and obstructive prostatic symptoms[34].

It consists of two endoscopic deep incisions by electrocautery at 5 and 7 clock position extending from ureteric orifices to the sides of verumontanum. A resectable prostate of less than 20 gm is easily amenable to incision. In larger prostates, TUIP is technically difficult and the results are unpredictable.

TUIP is comparatively less traumatic than TURP and therefore postoperative recovery is quicker. Similarly retrograde ejaculation is less frequent after TUIP than after TURP[35,36].

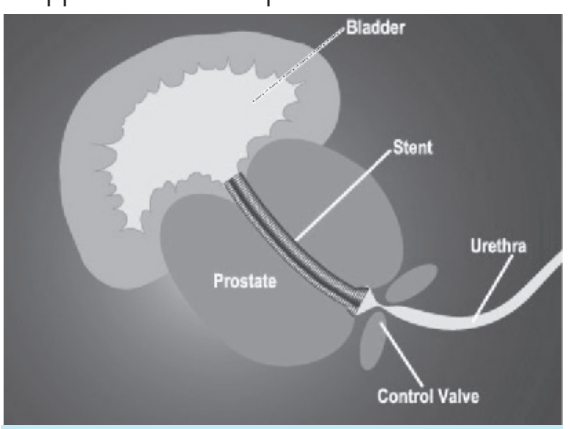


Resectoscope

TRANSURETHRAL LASER INDUCED PROSTATECTOMY (TULIP)

TULIP is another new technique being applied for the treatment of prostatic hyperplasia (PH). In TURP the obstruction is relieved by removal of tissue bulk but in laser prostatectomy, the prostatic tissue is coagulated by neodymium YAG laser. The results of laser prostatectomy are comparable with transurethral incision of prostate[44].

A modified the technique of TULIP is also used by inflation of an intraurethral balloon which leads to compression of prostatic tissue and the neodymium YAG laser energy is applied to the compressed tissue.



Prostatic stent

Compression of the tissue squeezes the blood out, thereby allowing greater penetration of the laser energy into the prostate45. The long term results are yet not available.

TRANSURETHRAL BALLOON DILATATION OF THE PROSTATE

The concept of dilatation of the prostatic urethra to relieve bladder outflow obstruction is not new. Previously it used to be the sounds and other dilating devices and now balloons are used. The balloon of 20-35 mm in diameters is placed endoscopically in the prostatic urethra.

A pressure of 4 atmosphere is applied for 15 minutes and prostatic urethra is dilated to 90 Fr. The exact mechanism of its action is not known but may be the stretching of prostatic capsule and tear of anterior commissure[37]. It is usually indicated in patients with small prostates (30gm) without middle lobe enlargement and young patients who want to avoid retrograde ejaculation. Even in selected patients the results are not comparable with TURP[38].

OPEN SURGERY

Open surgical intervention for prostatic hyperplasia (PH) can be done either trans vesical, retro-pubically or transperineally.

It is the oldest procedure to remove the prostate. The first transvesical prostatectomy was performed by Dittel in 1885.

Prostate can be removed either by transvesical, transcapsular (retropubic) or by perineal approach. Perineal prostatectomy has been almost abandoned[32]. Open prostatectomy was done in 20% of cases in America till 1986.

Hospital stay is prolonged in open prostatectomy as compared to TURP whereas postoperative incontinence and stricture formation is more with TURP[29,33].

MINIMALLY INVASIVE METHODS

These methods are adopted in patients who are unfit for surgical intervention. Following methods are adopted;

Prostatic Stents

The prosthetic stent is placed endoscopically into the prostatic urethra as an alternative to TURP39. Two types of Stents are available. Intraurethral non epithelialized stents (urospiral, prostakath) and extraurethral epithelialized stents (Wall stent). The former are easier to remove but are more prone to complications like migration, encrustation and infection.

The later can be placed with relative ease and thereafter, epithelialization renders removal increasingly difficult. The obvious advantage is that it can be placed under local anaesthesia and therefore can be applied in patients with bladder outflow obstruction who are unfit for anaesthesia[40].

Microwave Hyperthermia

Microwave hyperthermia is a relatively new approach for the management of prostatic hyperplasia (PH). It has been documented in the past that hyperthermia in the range of 42-45C is cytotoxic and is useful in the treatment of malignant neoplasms[41,42].

Microwave hyperthermia for the management of prostatic hyperplasia (PH) may be performed either by transurethral or transrectal route. In both techniques the tissue close to the microwave probe is cooled down and the heat is concentrated on the prostatic tissue and a heat of 42C to 45C is applied[43]. The long term results are not available yet.

Cryosurgery

The concept of cryosurgical prostatectomy was introduced in 1964 by Gonder et al46, but has not gained widespread acceptance. By applying cryosurgery, the prostate gland is converted into an iceball and leads to necrosis of the tissue. This necrotic tissue gets eliminated either through the catheter or after removal of catheter.

The procedure is done under either general or regional anaesthesia47. The cryosurgical probe is introduced into the prostatic urethra and the prostatic tissue is cooled down to -160C.

Obstruction is relieved in about 60% of patients. Infection and primary haemorrhage occurs in 53% and 15% of cases38. This technique is a poor alternative to TURP.

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