

A Comprehensive Review of Prostatomegaly Treatment And Post Surgical Complications

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ABSTRACT

Benign prostatic hyperplasia (BPH) also called prostate gland enlargement is a common condition as men get older. The prostate is a gland located at the junction of the urinary bladder and the urethra in men. It secretes a milky, alkaline fluid that constitutes approximately 30% of the volume of semen. It is covered by a connective tissue that contains smooth muscle fibers and elastic tissue. An enlarged prostate gland can cause uncomfortable urinary symptoms, such as blocking the flow of urine out of the bladder. It can also cause bladder, urinary tract or kidney problems. There are several effective treatments for prostate gland enlargement, including medications, minimally invasive therapies and surgery. To choose the best option, you and your doctor will consider your symptoms, the size of your prostate, other health conditions you might have and your preferences. Moderate to severe Lower Urinary Tract Symptoms (LUTS) from BPH or mild LUTS that are deemed bothersome by the patient may give pharmacologic treatment. The 2 major classes of medications for BPH are alpha-1 Adrenergic receptor antagonists and 5-alpha reductase inhibitors. During the procedure of transurethral resection of the prostate (turp) patient may experience bladder perforation, bleeding, coagulopathy, transient bacteremia and septicemia. A major complication of TURP is the excessive absorption of irrigation solution resulting in hypervolemia and dilutional hyponatremia. This review provides an overview of the etiology, symptoms, management, of benign prostatic hyperplasia as well as post-surgical complications and lifestyle modifications that may enhance patient conditions.

KEYWORDS; Benign prostatic hyperplasia, Lower Urinary Tract Symptoms, transurethral resection of the prostate, alpha-1 Adrenergic

receptor antagonists, 5-alpha reductase inhibitors, hypervolemia, dilutional hyponatremia.

I. INTRODUCTION

Prostatomegaly is used to describe **prostate enlargement**. The prostate is a gland located at the junction of the urinary bladder and the urethra in men. It secretes a milky, alkaline fluid that constitutes approximately 30% of the volume of semen. It is covered by a connective tissue that contains smooth muscle fibers and elastic tissue. Three zones are identified within the capsule: (1) the transition zone, located closest to the urethra; (2) the central zone, with the common duct from the prostate and seminal vesicles; and (3) the large peripheral zone. The prostate gland has a normal volume of approximately 20 to 30 g. An enlarged prostate gland can cause uncomfortable urinary symptoms, such as blocking the flow of urine out of the bladder. It can also cause bladder, urinary tract or kidney problems.^[1]

II. PRESENTATION AND ASSESSMENT

2.1. Lower Urinary Tract Symptoms

Symptoms of BPH gradually worsens over time and the severity of these symptoms varies in people with prostate gland enlargement. The patients may present with obstructive symptoms, irritative symptoms, or a combination of both.

2.2. Obstructive Symptoms

1. Sensation of incomplete bladder emptying
2. Straining to void
3. Urinary hesitancy
4. Weak urinary stream

2.3. Irritative Symptoms

1. Dysuria
2. Nocturia
3. Urinary frequency
4. Urinary urgency^[2]

The American Urologic Association Symptom Index (AUASI) ^[3] is a validated, self-administered, quantitative measure of the severity of LUTS due to BPH. The AUASI score ranges from 0 (no symptoms) to 35 (severe symptoms). In addition to diagnosis of BPH, the AUASI can aid in selecting initial therapy and helps to monitor the response to therapy; a 3-point change on the AUASI scale is considered significant. ^[4]

2.4. American Urologic Association symptom index

In the past month, how often have you experienced the following symptoms? ^[a]

1. Sensation of not completely emptying your bladder
2. Need to urinate less than 2 hours after urinating
3. Stopped and started again while urinating
4. Found it difficult to postpone urination
5. Had a weak urinary stream
6. Had to push or strain to begin urinating
7. How many times do you get up at night to urinate? ^[b]

2.5.[a] Scoring for questions

0: 1 to 6: Not at all;

- 1: Less than 20% of the time;
- 2: Less than 50% of the time;
- 3: 50% of the time;
- 4: More than 50% of the time;
- 5: All of the time.

[b] Scoring for question

7: Each time is worth 1 point (maximum of 5 points)

Total score is the sum of the scores for questions 1 to 7 (minimum 0, maximum 35)

III. DIAGNOSIS

BPH (Benign prostatic hyperplasia (BPH) — also called prostate gland enlargement) can be diagnosed with non-invasive ultrasound by measuring intravesical prostatic protrusion (IPP) which can be measured in the sagittal view of a comfortably full bladder (about 200 ml) and it is the distance from the innermost protrusion of the prostate perpendicularly down to the base at the circumference of the bladder. It has a 100% positive predictive value and 100% specificity for diagnosing prostate adenoma.

Prostate-specific antigen (PSA) is also important in the diagnosis. PSA is generally less than 1 µg/l, in patients with no clinical BPH, no prostatitis and no prostate cancer.

IV. TREATMENT

A variety of treatments are available for enlarged prostate, including medication, minimally invasive therapies and surgery. The best treatment choice depends on:

1. The size of prostate
2. Age
3. Overall health
4. The amount of discomfort experienced

4.1. NONPHARMACOLOGICAL TREATMENT

In patients with mild LUTS symptoms from BPH, medical or surgical treatment is not required.

1. Moderate use of alcohol
2. Moderate use of caffeine
3. Limit salt intake
4. Maintain a time voiding schedule
5. Limit fluid intake few hours before sleep ^[5]

4.2. PHARMACOLOGICAL TREATMENT

Moderate to severe LUTS from BPH or mild LUTS that are deemed bothersome by the patient may given pharmacologic treatment. The 2 major classes of medications for BPH are alpha-1 Adrenergic receptor antagonists and 5-alpha reductase inhibitors. The PDE-5 inhibitor tadalafil is also approved by the FDA in the treatment of BPH. ^[7]

- Alpha-1 Adrenergic Receptor Antagonists
Alfuzosin, Silodosin, Tamsulosin, Doxazosin, Terazosin
- 5-Alpha Reductase Inhibitors
Dutasteride, Finasteride

4.2.1. ALPHA-ADRENERGIC BLOCKERS

The smooth muscle of the prostate and bladder neck is controlled by alpha-adrenergic nerves. Contraction of the smooth muscle and an increase in dynamic urinary obstruction stimulates these sympathetic nerve fibers. ^[6] In males who have a partial blockage from an enlarged prostate, the alpha-1 adrenergic blockers enhance urine flow by relaxing the smooth muscle in the bladder neck and prostate. Alpha-blockers, also known as alpha-1 adrenergic receptor antagonists, are a class of drugs that bind and block type 1 alpha-adrenergic receptors, thus preventing the contraction of smooth muscle. Their main use are for symptomatic benign prostatic hypertrophy and hypertension. The nonselective alpha-1 adrenergic antagonists are helpful in treating the symptoms of urinary blockage caused by benign prostatic hypertrophy as they relax the smooth muscle in

both arterioles (alpha-1b receptors) and the bladder neck and prostate (alpha-1a receptors). Selective alpha-1a adrenergic receptor blockers for benign prostatic hypertrophy have recently been discovered, and they are said to have less of an impact on blood pressure. As a result, only nonselective medications are commonly used to treat hypertension, although both selective and nonselective medications have been used to treat the symptoms of prostatic hypertrophy.^[38]

a. ALFUZOSIN

A non-selective alpha-1 adrenergic antagonist called alfuzosin is used to treat benign prostatic hypertrophy. Alfuzosin has a minimal incidence of acute serum aminotransferase increases and rarely associated with acute liver damage.

- Available Dose

Alfuzosin available in extended release 10 mg tablets under the brand name Uroxatral. The suggested dosage is 10 milligrams once daily with the same meal.

- Side Effects

Hypotension, fainting, syncope (especially after the first dose), tiredness, headaches, palpitations, impotence, incontinence, and gastrointestinal discomfort are among of the side effects. Postural hypotension, worsening of angina pectoris, priapism, and intraoperative floppy iris syndrome are uncommon but potentially serious side effects.^[39]

b. SILODOSIN

Under the brand name Rapaflo, silodosin is available in 4 and 8 mg capsules.

- Available Dose

4 to 8 mg once daily is the recommended dosage.

- Side Effects

Retrograde ejaculation, orthostatic hypotension, vertigo, diarrhoea, thirst, stuffiness in the nose, and headaches are some of the side effects. Severe postural hypotension and intraoperative floppy iris syndrome are uncommon but potentially serious side effects.^[42]

c. TAMSULOSIN

Tamsulosin exists in capsules with a dose of 0.4 and 0.8 mg and is marketed as Flomax among other generic names.

- Available Dose

The dose is between 0.4 and 0.8 mg once per day.

- Side Effects

Retrograde ejaculation, orthostatic hypotension, lightheadedness, diarrhoea, thirst, stuffy nose, and headache are some of the side symptoms. Rare, but potentially serious adverse responses include orthostatic hypotension, priapism and intraoperative floppy lens syndrome.^[41]

d. DOXAZOSIN

Doxazosin is marketed as Cardura and is available in tablets with doses of 1, 2, 4, and 8 mg.

- Available Dose

Doxazosin is typically begun at 1 mg once a day, and the dose is increased based on tolerance and clinical response to an average of 4 to 8 mg once daily. Hypertension can be treated with higher dosages. Doses of 4 mg and 8 mg of doxazosin are also marketed in an extended release formulation (Cardura XL).

- Side Effects

Dizziness and syncope (especially after the first dose), tiredness, headaches, palpitations, impotence, incontinence, and gastrointestinal distress are among of the side effects. Priapism, floppy iris syndrome, and severe postural hypotension are uncommon but possibly serious adverse responses.^[40]

e. TERAZOSIN

The hydrochloride salt of terazosin, available in 1 mg, 2 mg, 5 mg, and 10 mg dosages, is marketed in the US as an oral capsule.

- Side Effects

Nasal congestion, weakness, postural hypotension, headaches, and dizziness are some of the side effects.^[43]

4.2.2. 5-ALPHA REDUCTASE INHIBITORS

Prostatic tissue can be stimulated by testosterone and its metabolite DHT, which is produced through the action of the enzyme 5-alpha reductase. Blocking the action of 5-alpha reductase can help reduce the stimulation of prostatic tissue through reduction of levels of DHT while preserving the androgen effects of testosterone.^[2] The 5-alpha reductase inhibitors work by preventing the formation of dihydrotestosterone, a major prostatic growth factor, from testosterone. Dihydrotestosterone levels drop, which causes the prostate to gradually shrink. This can improve urine flow.^[38]

a. DUTASTERIDE

A daily dosage of 0.5 mg of dutasteride is recommended. Dutasteride is often administered over a lengthy period of time, and results typically take 3 to 6 months to appear.

- Side Effects

Although they are rare, side effects might include gynecomastia, impotence and diminished libido, ejaculation abnormalities, weariness, and dizziness. Additionally, dutasteride lowers blood PSA levels, which need to be watched during treatment.^[44]

b. FINASTERIDE

For oral administration, finasteride tablets with 1 mg or 5 mg are available.

- Side Effects

Common side effects of finasteride include erectile dysfunction (2% to 4%), loss of libido, reduced ejaculatory volume, and gynecomastia. Orthostatic hypotension and it also correlate. In individuals using concurrent alpha-blockers, this adverse effect may worsen. Approximately 9% of users of finasteride as monotherapy and up to 18% of users as of combination treatment apparently experience orthostatic hypotension.

In certain people, ongoing sexual dysfunction might cause suicidality and other bad psychological things to happen. Recent reports have raised concerns about post-finasteride syndrome (PFS). This phrase describes when negative side effects persist even after therapy is stopped.^[45]

4.2.3. PHOSPHODIESTERASE-5 INHIBITORS

PDE-5 is present in prostatic tissue, the bladder detrusor muscle, and vascular smooth muscle that is associated with the urinary tract.⁹ The PDE-5 inhibitor may also improve LUTS. The resulting increase in cyclic AMP and cyclic guanosine monophosphate relaxes smooth muscle, when PDE-5 is inhibited.^[5]

V. SURGICAL THERAPIES

Several different types of surgery can be used to remove the prostate tissue that blocks the flow of urine, including:

5.1. Transurethral resection of the prostate (TURP):

In this procedure the tissue blocking the ureter is removed using special instruments Side effects

include bleeding, infection, impotence, incontinence and retrograde ejaculation.

5.2. Transurethral incision of the prostate (TUIP):

The surgeon makes two small cuts in the bladder neck (where the urethra and bladder join) and in the prostate to widen the urethra to improve urine flow.

5.3. Transurethral electro vaporization:

This uses electrical energy applied through an electrode to rapidly heat prostate tissue, turning the tissue cells into steam. This allows the surgeon to vaporize an area of the enlarged tissue and relieve urinary blockage.

5.4. The Greenlight laser:

This procedure removes prostate tissue with a laser. It helps by lessening bleeding during and after the procedure

VI. INDICATIONS FOR SURGICAL TREATMENT OF BENIGN PROSTATIC HYPERTROPHY

1. Failure of medical therapy
2. Refractory urinary retention
3. Recurrent urinary tract infection
4. Persistent hematuria
5. Bladder stones
6. Renal insufficiency^[5]

VII. COMPLICATIONS OF TRANSURETHRAL RESECTION OF THE PROSTATE (TURP)

7.1. BLADDER PERFORATION:

Bladder perforation during TURP is a rare complication that is usually caused due to a high and sudden increase in intravesical pressure. Bladder explosion during TURP is very rare and is due to the contact of the electrocautery with a mixture of gases that are produced during the resection procedure.^{[8][9][10][11]}

•Signs of perforation are the inability to distend the bladder, low retrieval of irrigation fluids and abdominal distension. Peritonitis may occur if a perforation diagnosis is delayed. Early detection and diagnosis are crucial for the prevention of severe complications, such as peritonitis and sepsis.^[12]

•Extraperitoneal perforation is usually managed with adequate bladder drainage via a urethral catheter, although surgery may be required.^[13]

•Intraperitoneal perforations are more severe than extraperitoneal perforations as they can trigger fluid leakage and absorption into the peritoneal cavity.^[14]

7.2. BLEEDING:

The scab inside the bladder may loosen causing bleeding in the first weeks after TURP surgery. The bleeding stops after bed rest and drinking fluids. However, the bleeding may be so heavy that it becomes difficult to see through the urine or may contain clots.^[15]

7.3. COAGULOPATHY:

Although TURP is considered to be the most effective surgical procedure for symptomatic BPH,^{[16][17]} concerns still remain regarding its complications caused by the absorption of irrigating fluid, such as pulmonary edema, severe bleeding, hyponatremia and myocardial arrhythmia.^{[18][19][20][21]} In particular, coagulopathy occurs when an excessive volume of irrigating fluid is absorbed. Postoperative hematuria, along with hemorrhagic symptoms, has been reported, which may result from disseminated intravascular coagulopathy.^[22]

Blood coagulation parameters can be measured before and at the end of TURP. Fluid absorption was measured by the ethanol method. There was a close correlation between the changes in hemostatic parameters and blood hemoglobin concentration. Fibrinolysis was found by increasing titres of fibrin degradation products in most patients. The coagulation parameters during and after TURP varies with the dilution of the blood.^[23]

7.4. TRANSIENT BACTEREMIA AND SEPTICEMIA:

Transient bacteremia occurs in a variety of procedures, particularly those associated with mucous membrane trauma.^[24]

Asymptomatic bacteremia is commonly caused by transurethral resection of the prostate (TURP) and occurs despite prophylaxis, researchers concluded. The findings challenge a commonly held view that urine is the primary source of bacteremia in TURP-associated sepsis and raise the possibility of occult prostatic infection as a cause of bacteremia. A life-threatening complication of an infection. Sepsis occurs when chemoreceptors, released in the bloodstream to fight an infection, trigger an inflammation. This can cause a cascade of changes that can damage and lead to failure of multiple organ systems.^[25]

7.5. TOXICITY OF IRRIGATING FLUIDS:

A) HYPERVOLEMIA-

A major complication of TURP is the excessive absorption of irrigation solution resulting in hypervolemia and dilutional hyponatremia.

Marking the irrigation fluid with ethanol is a method for the early detection of fluid absorption.^[26]

B) HYPONATREMIA-

Excessive absorption of the irrigation solutions used during TURP, which are highly hypotonic can cause dilutional hypo-osmolality and hyponatremia resulting in severe neurological symptoms. Hyponatremia symptoms do not generally occur until serum sodium concentrations are below 120 mmol/l. If the plasma is hypotonic, acute intravascular hemolysis may occur.^{[27][28][29][30]}

Early diagnosis is most important in the treatment of TURP syndrome. The treatment must be arranged according to the severity of the symptoms. First, the absorbed water must be eliminated and hypoxemia and hypoperfusion must be prevented. Loop diuretics such as furosemide can be used to eliminate excess fluid.^[31] If severe symptomatic hyponatremia is present with impaired consciousness and convulsions, hypertonic saline solutions can be administered. The amount and rate of the hypertonic saline solution (3% or 5%) to treat hyponatremia is adjusted according to the patient's serum sodium concentration.^[32] to avoid circulatory overload it is recommended that the rate of the hypertonic saline solution infusion should not be higher than 100 ml/h if serum sodium concentration is above 120 mmol/l. The hyponatremia must be treated aggressively to avoid intravascular hemolysis if serum sodium concentration is below 100 mmol/l.^[31]

C) HYPOTHERMIA

Hypothermia is a frequent observation in elderly males undergoing transurethral resection of prostate (TURP) under spinal anesthesia. The use of irrigating fluids at room temperature causes a decrease in body temperature. Warmed irrigating solutions have shown to reduce heat loss and the resultant shivering.^[33]

VIII. COMPLICATIONS OF POST SURGERY

It is a surgical procedure that involves cutting away a section of prostate, the prostate is a small gland in the pelvis only found in men, and it has some major and minor complications in pre-operative and post-operative periods such as

8.1. BLEEDING

➤ Haematuria

8.2. INFECTION

- Cystitis
 - Urinary Tract Infection
 - Kidney Infection
- 8.3. OBSTRUCTION
- Urinary Retention
 - Bladder Neck Obstruction
 - Urethral Stricture
- 8.4. RENAL
- Ureteric Obstruction
 - Impaired Renal function
- 8.5. CARDIOVASCULAR
- Myocardial Infraction
- 8.6. THROMBOEMBOLIC
- Pulmonary embolism
 - Deep Vein Thrombosis ^[34]

8.1. BLEEDING

➤ HEMATURIA-After having a TURP a post complication of blood in urine may occur around a week or two weeks after operation, drinking plenty of fluid will help to flush any blood or blood clots out of your bladder

8.2. INFECTION

a. CYSTITIS

➤ It is an inflammation of bladder, it was mainly caused in post TURP which can be treated with appropriate antibiotics.

b. URINARY TRACT INFECTION

➤ It is also a most common and possible complication after TURP .An infection most likely to occur the longer you have catheter in place ,which can be treated with Antibiotics.

c. KIDNEY INFECTION

Inflammation of Kidney, It rarely occurs in some patients with recurrent urinary tract infection, in post TURP. ^[35]

8.3. OBSTRUCTION

a. URINARY RETENTION

It occurs in about 20% of men, it is due to the small blood clots that obstruct the flow of urine and post-operative swelling

b. BLADDER NECK OBSTRUCTION

It is a rare condition which occurs in men after prostate surgery, obstructions in bladder due to blood clots, treatment includes dilation in which tubes are used to widen the urethra and its opening.

c. URETHRAL STRICTURE

It involves scarring that narrows the tube which carries urine. It is one of the most common

complications in TURP presents within 6 months after surgery, incidence of about 2.2% and 9.8 % ^[36]

8.4. RENAL

a. URETRIC OBSTRUCTION

It is the blockage of one or both tubes that carry urine from kidney to the bladder , commonly occurs in post TURP, in severe cases Urethral stents can be placed in order to dilate the ureter.

b. IMPAIRED RENAL FUNCTION

It is also a rare complication ,which mainly occurs in Urology patients are at high risk of kidney injury because of urinary obstruction, age .etc and in some cases it also causes RENAL FAILURE

8.5. CARDIOVASCULAR

a. MYOCARDIAL INFRACTION

The incidence rate of acute myocardial infraction in patients undergoing TURP is some what low .It was mainly caused in elderly and also has other cardiac complications like congestive cardiac failure of about (30%)

8.6. THROMBOEMBOLIC

a. PULMONARY EMBOLISM

Thromboembolic complications following TURP are rare, but have an intermediate risk of developing pulmonary emboli may occur with unidentifiable risk factors. ^[37]

IX. LIFESTYLE AND HOME REMEDIES

- Limit beverages in the evening. Don't drink anything for an hour or two before bedtime to avoid nocturnal urination.
- Limit caffeine and alcohol as they can increase urine production, irritate the bladder and worsen symptoms.
- Limit decongestants or antihistamines. These drugs control urine flow by tightening the band of muscles around the urethra.
- Go when you first feel the urge as waiting too long might overstretch the bladder muscle and cause damage.
- Schedule bathroom visits. Try to urinate every four to six hours during the day.
- Follow a healthy diet. Obesity is associated with enlarged prostate.
- Stay active. Inactivity contributes to urine retention. Light exercises can help reduce urinary problems caused by an enlarged prostate.

- Urinate and then urinate again a few moments later. This is called double voiding.
- Avoid colder temperatures as it causes urine retention and increase the urgency to urinate.

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