Benign Prostatic Hyperplasia

Description/Etiology

Benign prostatic hyperplasia (BPH; also called benign prostatic hypertrophy) is a nonmalignant condition in which excessive proliferation of smooth muscle and epithelial cells results in an enlarged prostate gland that constricts or deforms the lower urinary tract and causes difficulty with urination. BPH occurs primarily in older men, affecting 50% of men by age 60 and 90% of men by age 85. BPH is rare in men under the 40 years of age.

Although the etiology of BPH is not fully understood, results of animal studies suggest that age-related sex hormone imbalances of testosterone, estrogen, and dihydrotestosterone (DHT) might cause excessive growth of prostatic tissue, causing the gland to enlarge, compress the urethra, and protrude into the bladder neck, resulting in urinary outlet irritation, obstruction, and urinary retention. The hypothesized etiologies of BPH suggest that prostate cell growth caused by reactivation of genes in the prostate cells plays a role in impaired catechol-o-methyl transferase gene activity.

Potential complications of BPH include bladder stones, prostatitis, hematuria, urinary retention, and renal failure. BPH is diagnosed based on patient history and a variety of tests, including digital rectal examination (DRE), prostate-specific antigen (PSA) blood test, transrectal ultrasound (TRUS), and prostate biopsy. BPH should be differentiated from prostate cancer (CaP), urinary tract infection (UTI), prostatitis, urethral stricture, overactive bladder, neurogenic bladder, bladder cancer, poorly controlled diabetes, and neurologic conditions (e.g., Parkinson’s disease, diabetic autonomic neuropathy, multiple sclerosis, spinal cord injury) that produce neurogenic bladder and other bladder signs and symptoms.

BPH can significantly decrease quality of life and clinician assessment of symptomology is important. The American Urological Association (AUA) recommends evaluating patients’ signs and symptoms and quality of life using the International Prostate Symptoms Score (IPSS) questionnaire. A score of < 7 indicates mild signs and symptoms, scores of 8–19 indicate moderate signs and symptoms, and scores of 20–35 indicate severe signs and symptoms.

The AUA recommends watchful waiting for patients with an IPSS score of < 7 and patients who have not developed bothersome symptoms or severe complications. Treatment options for BPH include surgery and use of pharmacologic agents such as nonselective or selective alpha-adrenergic blockers to help relax the smooth muscle tissue of the prostate and bladder neck, which improves urinary flow; 5-alpha-reductase inhibitors to reduce prostate size; stool softeners for constipation; analgesics for pain; muscle relaxants to reduce pelvic muscle spasms; and antibiotics for infection. Surgical procedures to remove part or all of the prostate gland include transurethral resection of the prostate (TURP) and suprapubic or retropubic prostatectomy. Minimally invasive surgical procedures include holmium laser ablation of the prostate, transurethral vaporization of the prostate, interstitial laser coagulopathy, high-frequency focused ultrasound, transurethral needle ablation (TUNA), transurethral microwave thermoplasty (TMT), transurethral balloon dilatation therapy, transurethral ethanol ablation, and water-induced thermoplasty. In 2013, the U.S. Food and Drug Administration (FDA) approved the UroLift system as a less invasive alternative for the treatment of BPH. The UroLift system is a trans-prostatically permanent implant that is designed to lift the prostate and relieve blockage of the urethra. (For more information,
Facts and Figures
BPH is the most common cause of urinary tract obstruction in men over the age of 50, affecting ~14 million men in the United States and ~30 million men worldwide. Evidence for racial predisposition is not supported. Up to 33% of men with BPH have coexisting CaP.

Risk Factors
Risk factors for BPH include advanced age, intact testes, and family history of BPH. Abdominal obesity and consumption of a diet high in fat and red meat are possible risk factors. The risk for complications increases proportionally with the amount of prostatic enlargement. Although the prevalence of BPH is nearly equal in Whites and Blacks, Black men tend to have more severe symptoms and progressive cases; it is theorized that this is a result of higher levels of testosterone, growth factor activity, androgen receptor expression, and 5-alpha-reductase activity which contributes to an increased rate of prostatic hyperplasia.

Signs and Symptoms/Clinical Presentation
Obstructive signs and symptoms include urinary hesitancy or retention, decreased force and caliber of the urine stream, sensation of incomplete bladder emptying, straining to urinate, and post-void dribbling. Signs and symptoms of irritation include increased urinary urgency, frequency, and nocturia.

Assessment
› Patient History
  • Ask about history of urinary dysfunction and family history of BPH
› Physical Findings of Particular Interest
  • DRE can identify smooth, firm, elastic enlargement of the prostate in men with BPH
  • Physical examination might show bladder distention and neurologic dysfunction (e.g., sensory and/or motor dysfunction)
› Laboratory Tests
  • PSA levels can be elevated in patients with both BPH and CaP
  • Serum chemistry studies might show ↑ serum blood urea nitrogen and creatinine levels
  • UA and urine culture will evaluate for UTI, prostatitis, hematuria, and pyuria
  • Histopathologic testing of biopsied prostate tissue is negative for malignancy in BPH
› Other Diagnostic Tests/Studies
  • Pressure flow studies and flow rate testing can assess urinary flow
  • TRUS can measure the prostate size; abdominal ultrasound can show hydronephrosis or increased post-void residual, when present
  • Cystoscopy can show renal obstruction, when present
  • Chest X-ray and EKG can assess pre- and postoperative pulmonary and cardiac status

Treatment Goals
› Promote Symptomatic Relief and Reduce Risk of Complications
  • Assess all physiologic systems and review laboratory/diagnostic study results for abnormalities; assess for pain, voiding dysfunction, infection, and constipation
    – Administer prescribed antibiotics for infection, nonselective alpha-adrenergic blockers (e.g., doxazosin), selective alpha-adrenergic blockers (e.g., terazosin, tamsulosin) to help relax the bladder, 5-alpha reductase inhibitors (e.g., finasteride, dutasteride) to reduce size of enlarged prostate, stool softeners and laxatives for constipation and to reduce straining, muscle relaxants to reduce pelvic muscle spasms, and/or analgesics (e.g., ibuprofen, aspirin) for pain
    – Insert an indwelling urinary catheter if ordered for patients with urinary retention and/or obstruction and provide meticulous hygiene; monitor catheter patency and urine collection, and avoid rapid bladder decompression
  • Follow facility pre- and postsurgical protocols if patient becomes a surgical candidate; reinforce pre- and postsurgical education and verify completion of facility informed consent documents. Monitor closely for complications following surgery, including septic shock, renal failure, and heart failure
Monitor vital signs, intake and output, nutritional and respiratory status, response to treatment, and for adverse effects of medication.

Maintain prescribed bed rest and adherence to a fluid-restrictive diet, and provide sitz baths for comfort, as ordered.

**Educate and Provide Emotional Support**
- Assess patient’s anxiety level and coping ability; provide emotional support and educate about BPH pathophysiology, potential complications, treatment risks and benefits, and individualized prognosis.

**Food for Thought**
- Although in some cases sexual function is initially affected after surgery for BPH, function usually fully returns with time. Retrograde ejaculation (i.e., semen entering the bladder instead of exiting through the urethra during ejaculation) can occur, but is rare.
- Some men with BPH use alternative treatment (e.g., herbs such as saw palmetto, African plum tree, rye, stinging nettle root), although there is no evidence of their effectiveness. Authors of a meta-analysis concluded that double and triple doses of saw palmetto did not improve urinary flow or reduce prostate size in men with BPH (Tacklind et al., 2012).
- BPH and androgenetic alopecia (AGA; i.e., male pattern baldness) are both androgen-dependent conditions, and researchers in a case-control study of 87 men found that early onset AGA can be an early marker of BPH (Arias-Santiago et al., 2012).
- Authors in a study of 788 patients with BPH with an average age of 66.9 years of age found that prostatic artery embolization (i.e., placing microspheres in the prostate arteries) is an effective treatment option for lower urinary tract symptoms related to BPH in the short and medium term periods (Kuang et al., 2017).

**Red Flags**
- Avoid checking for fecal impaction because DRE can precipitate bleeding.
- Some alpha-adrenergic blockers (e.g., alfuzosin, doxazosin, terazosin) produce a vasodilatory effect that is associated with increased risk for vascular events (e.g., presyncope, syncope).

**What Do I Need to Tell the Patient/Patient’s Family?**
- Educate to increase water intake to flush the bladder, avoid straining during bowel movements, eat a nutritious diet but avoid spicy foods, avoid alcoholic or caffeinated drinks, avoid heavy lifting, and avoid driving or operating heavy machinery.
- Emphasize the importance of continued medical surveillance, including PSA screening and IPSS screening every 3–6 months.
- Educate to seek immediate medical attention for new or recurrent urinary signs and symptoms, surgical complications, and medication side effects.

**References**