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Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: AUA Guideline (2026) Part III: Procedural/Surgical Management

Ramy Goueli,[1] Gopal H. Badlani,[2] Charles Welliver,[3] Paul D. Anderson,[4] Scott R. Bauer,[5,6] Tracy Dana,[7] Rodrigo Donalisio da Silva,[8] Rebecca Holmes,[7] Sennett K. Kim,[9] Erin Kirkby,[9] Steven Maislos,[10] Bradley C. Gill,[11] Timothy McClure,[12] Nicole L. Miller,[13] Iraj Roshan,[14] Stephen J. Summers,[15] Annette Totten,[7] and Jaspreet S. Sandhu[16]

[1]*Department of Urology, University of Texas Southwestern Medical Center, Dallas, Texas*
[2]*Department of Urology, Wake Forest University Baptist Medical Center, Winston Salem, North Carolina*
[3]*Department of Urology, Albany Medical College, Albany, New York*
[4]*Department of Urology, Royal Melbourne Hospital, Victoria, Australia*
[5]*Division of General Internal Medicine, University of California San Francisco, San Francisco, California*
[6]*San Francisco Veteran Affairs Healthcare System, San Francisco, California*
[7]*Pacific Northwest Evidence-Based Practice Center, Oregon Health & Science University, Portland, Oregon*
[8]*Department of Surgery, Division of Urology, University of Texas Houston McGovern Medical School, Houston, Texas*
[9]*American Urological Association, Linthicum, Maryland*
[10]*Department of Urology, Urology Institute of Houston, Houston, Texas*
[11]*Department of Urology, Cleveland Clinic, Cleveland, Ohio*
[12]*Department of Urology and Radiology, Weill Cornell Medicine, New York, New York*
[13]*Department of Urology, Vanderbilt Health, Nashville, Tennessee*
[14]*Flint, Texas*
[15]*Department of Surgery, Division of Urology, University of Utah, Salt Lake City, Utah*
[16]*Department of Surgery, Department of Urology, Memorial Sloan Kettering Cancer Center, New York, New York*

Purpose: Procedural therapies for lower urinary tract symptoms/benign prostatic hyperplasia (LUTS/BPH) are expansive and are associated with distinct risks and benefits. This Guideline covers the treatment of LUTS/BPH. The summary presented herein represents Part III of the three-part series addressing procedural/surgical management of LUTS/BPH. Please refer to Parts I and II for additional information on this topic.

Materials and Methods: The systematic review that informs this Guideline was based on searches in Ovid MEDLINE, the Cochrane Central Register of

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Author Contributions:
Conception and design: Goueli, Badlani, Welliver, Anderson, Bauer, Donalisio da Silva, Kim, Kirkby, Maislos, Gill, Miller, Roshan, Summers, Sandhu.
Data acquisition: Dana, Donalisio da Silva, Maislos.
Data analysis and interpretation: Goueli, Badlani, Welliver, Anderson, Bauer, Dana, Donalisio da Silva, Kim, Maislos, Gill, Miller, Summers, Sandhu.
Critical revision of the manuscript for scientific and factual content: Goueli, Badlani, Welliver, Anderson, Bauer, Donalisio da Silva, Kim, Maislos, Gill, Miller, Roshan, Summers, Sandhu.
Drafting the manuscript: Badlani, Welliver, Anderson, Bauer, Dana, Donalisio da Silva, Kirkby, Maislos, Gill, Miller.
Statistical analysis: Badlani, Anderson, Dana, Maislos, Roshan, Summers, Sandhu.
Supervision: Goueli, Welliver, Bauer, Donalisio da Silva, Kim, Kirkby, Maislos, Gill, Miller, Summers, Sandhu.
Other: Badlani, Maislos.
Corresponding Author: Ramy Goueli, MD, MHS, Department of Urology, University of Texas Southwestern Medical Center, 2001 Inwood Rd, West Campus Building 3, 4th Floor, Dallas, TX 75390-9110 (ramy.goueli.uro@gmail.com).

Abbreviations and Acronyms

AC = Anticoagulant
AEEP = Anatomic endoscopic enucleation of the prostate
AI = Artificial intelligence
AP = Antiplatelet
AUR = Acute urinary retention
BPH = Benign prostatic hyperplasia
B-TURP = Bipolar transurethral resection of the prostate
CT = Computed tomography
EjD = Ejaculatory dysfunction
FDA = U.S. Food and Drug Administration
HIFU = High-intensity focused ultrasound
HoLEP = Holmium laser enucleation of the prostate
IIEF-EF = International Index of Erectile Function-Erectile Function
IPDCB = Intraprostatic drug coated balloon
IPSS = International Prostate Symptom Score
KTP = Potassium titanyl phosphate
LBO = Lithium triborate
LUTS = Lower urinary tract symptoms
mpMRI = Multiparametric magnetic resonance imaging
MRI = Magnetic resonance imaging
M-TURP = Monopolar transurethral resection of the prostate
OSP = Open simple prostatectomy
PAE = Prostate artery embolization
PBNO = Primary bladder neck obstruction
PICOTS = Populations, interventions, comparators, outcomes, timing, settings
PSA = Prostate-specific antigen
PUL = Prostatic urethral lift
PVP = Photoselective vaporization of the prostate
PVR = Post-void residual
Q_{max} = Maximum urinary flow rate
RCT = Randomized controlled trial
rUTI = Recurrent urinary tract infection
RWT = Robotic waterjet treatment
ThuLEP = Thulium laser enucleation of the prostate
TIPD = Temporary implanted prostatic device
TPLA = Transperineal laser ablation of the prostate
TUIP = Transurethral incision of the prostate
TURBN = Transurethral resection of the bladder neck
TURP = Transurethral resection of the prostate
TUVP = Transurethral vaporization of the prostate
UDS = Urodynamic studies
WVTT = Water vapor thermal therapy

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Controlled Trials, and the Cochrane Database of Systematic Reviews through January 2025. Update searches were conducted on December 15, 2025. Literature searches were limited to studies of medical therapies published since 2009 and surgical studies published since 2014. The searches were supplemented by reviewing electronic database reference lists of relevant articles. Criteria for inclusion and exclusion of studies were based on the Key Questions and the populations, interventions, comparators, outcomes, timing, types of studies and settings (PICOTS) of interest developed by the Panel.

Results: Guideline statements herein address general procedural principles and management of LUTS/BPH. Evidence- and consensus-based statements were developed to assist clinicians considering procedural interventions based on individual patient characteristics. Additional sections addressing sexual function, retreatment rates, and postoperative follow-up were included to support patient counseling and procedural selection.

Conclusions: Procedural management of LUTS/BPH involves a complex balance between efficacy, durability, and procedure-specific adverse effects. Shared decision-making is essential to tailor therapy to the individual patient.

BACKGROUND

Treatment Indications

Procedural options for BPH are broad and include transurethral, open, laparoscopic, robotic, and endovascular approaches. These procedures differ in their mechanisms of action, with some aiming to mechanically reposition prostatic tissue, others inducing tissue necrosis, and others focusing on debulking of the adenoma through resection or enucleation. In addition, each approach carries distinct considerations related to anesthesia requirements, hospital length of stay, and bleeding risk. With the wide variety of procedural options available, the Panel recommends clinicians to practice shared decision-making weighing the efficacy and durability of each procedure against individual side effect profiles.

PROCEDURAL THERAPIES

General Procedural Principles

Clinicians should offer procedural therapies for patients who have renal insufficiency secondary to BPH, refractory urinary retention secondary to BPH, recurrent urinary tract infections (rUTIs), recurrent bladder stones or gross hematuria due to BPH, and/or LUTS/BPH refractory to other therapies, or are unwilling to use other therapies. (*Clinical Principle*)

There continue to be indications for early utilization of procedural therapies including acute and/or chronic renal insufficiency secondary to BPH, refractory urinary retention, rUTIs, and bladder calculi. Finally, while an appropriate hematuria workup should not be sacrificed, procedural therapy for refractory hematuria due to prostatic bleeding may be of benefit to patients.

Clinicians should not perform a procedure solely for the presence of an asymptomatic bladder diverticulum; however, evaluation for the presence of BOO should be considered. (*Clinical Principle*)

Bladder trabeculation and diverticula are frequently noted in men with long-standing LUTS/BPH. However, a bladder diverticulum is not an absolute indication for surgery in men without clinically significant signs or symptoms (eg, rUTI).

Clinicians should counsel patients with LUTS/BPH about the progressive bladder functional changes associated with LUTS/BPH to inform procedural timing and selection. (*Expert Opinion*)

The goal for urologists should be to try and prevent these end-organ changes in bladder function with the hope of regaining completely normal functioning of the bladder. Based on individual patient characteristics, clinicians should undergo shared decision-making considering patient factors to supplement counseling on procedural timing and selection.

Clinicians should educate patients with LUTS/BPH considering procedural therapy on potential changes in orgasmic, erectile, and ejaculatory function associated with procedural intervention. (*Clinical Principle*)

Patients may not be aware that erection, orgasm, and ejaculation are all physiologically distinct and while interconnected can occur independently. Educating patients on sexual function will help them understand how BPH procedures may risk dysfunction in one of these processes without affecting another.

Clinicians should discuss known relative BPH-specific retreatment rates with patients considering procedural intervention. (*Moderate Recommendation; Evidence Level: Grade B*)

Following BPH procedures, retreatment rates due to recurrent obstruction are lowest with the greatest extent of adenoma removed and can increase with time from treatment as occlusive tissue

regrows. Procedural retreatment has been characterized in multiple systematic reviews and retrospective studies.[1-4] However, most data for minimally invasive treatments included in such reviews consists of clinical trial cohorts, which are often relatively homogenous with regard to patient characteristics, on account of the strict inclusion and exclusion criteria used in pivotal studies. The ability to achieve durable results, as evidenced by low retreatment rates, is often balanced against a greater risk of side effects (ie, ejaculatory dysfunction [EjD], urinary incontinence, stricture).

In patients with LUTS/BPH pursuing ejaculation-sparing procedures, clinicians should discuss that the tissue preserving nature of these technologies increases the risk for BPH-specific retreatment. *(Expert Opinion)*

Non-ablative therapies frequently have retrograde ejaculation rates that are in the single digit percentages and frequently approach 0. However, these procedures have also demonstrated higher BPH-specific retreatment rates especially in larger prostates likely related to the preservation or persistence of tissue.[5,6] With potentially a few exceptions (depending on long-term outcomes), there exists a trade-off between the selection of an ejaculatory-sparing procedure in that there appears to be higher BPH-specific needs for retreatment in these patients.

Clinicians should evaluate patients for at least one year after their BPH procedure to assess response to therapy. Re-evaluation should include standardized symptom scores and assessment of adverse events. Clinicians may assess post-void residual (PVR) and uroflowmetry. (*Clinical Principle*)

Post-procedural evaluation of patients following BPH procedures is necessary to determine response to therapy and to exclude adverse events. While the length of follow-up will vary dependent on individual patient needs and clinician discretion, the Panel recommends that patients be assessed for a minimum of 1 year following their BPH procedure. Clinicians should consider a longer duration of follow-up for patients who had BPH procedures associated with higher retreatment rates.

PROCEDURAL TECHNOLOGIES

Transurethral Resection of the Prostate

Clinicians should offer bipolar transurethral resection of the prostate (B-TURP) or monopolar TURP (M-TURP) as an option for patients for the treatment of LUTS/BPH. (*Strong Recommendation; Evidence Level: Grade A*)

A number randomized controlled trials (RCTs) have shown M-TURP and B-TURP were both effective in relieving LUTS and associated with similar improvements in quality of life scores at up to 3 years.[7,8] TURP remains the historical standard by which all other subsequent surgical approaches to treatment of BPH have often been compared and has long served as the reference group for other techniques.

Transurethral Incision of the Prostate

Clinicians may offer transurethral incision of the prostate (TUIP) as an option for patients with prostates < 30 cc and without a median lobe for the treatment of LUTS/BPH. (*Clinical Principle*)

There have been numerous technologies utilized in this procedure including athermal techniques, electrocautery, and numerous laser technologies.[9,10] There has been no data favoring one technique over another. Unfortunately, long-term data following TUIP is limited, therefore, it is unclear how durable this procedure is.

Vaporization of the Prostate

Clinicians should offer photoselective vaporization of the prostate (PVP) as an option for patients for the treatment of LUTS/BPH. (*Strong Recommendation; Evidence Level: Grade B*)

PVP is a laser procedure used to treat LUTS/BPH that operates at a wavelength of 532 nm and has evolved over time with improvement in the power of the device. There are multiple systematic reviews and meta-analysis showing the efficacy of PVP as a treatment option for LUTS/BPH.[11-13] When comparing the availability of lasers, the Panel came to consensus that the 80 W PVP laser is less effective than the 120 W and 180 W PVP lasers and that, given the option, it is best to use the higher power PVP lasers.

Clinicians may offer bipolar transurethral vaporization of the prostate (TUVP) as an option for patients for the treatment of LUTS/BPH. (*Clinical Principle*)

TUVP of the prostate is a technical electrosurgical modification of B-TURP. When comparing TUVP with TURP, outcomes were similar in both groups for long-term response to treatment based on varying definitions using IPSS, rates of reoperation, and rates of urinary incontinence.[14]

Anatomic Endoscopic Enucleation of the Prostate

Clinicians should offer laser enucleation of the prostate (i.e., holmium laser enucleation of the prostate [HoLEP], thulium laser enucleation of the prostate [ThuLEP]) as an option for patients for the treatment of LUTS/BPH. (*Strong Recommendation; Evidence Level: Grade A*)

HoLEP was the first anatomic endoscopic enucleation of the prostate (AEEP) technique described and gained the most traction, with HoLEP and ThuLEP having the most robust long-term efficacy, durability, and safety data available.[15-18] Laser enucleation of the prostate is recognized as having a steeper learning curve compared to other BPH procedures. While the Panel recommends clinicians offer HoLEP and ThuLEP to patients for the treatment of LUTS/BPH, the decision to perform these procedures must be based on the expertise and experience of the clinician as well as equipment availability.

Clinicians may offer alternative transurethral enucleation techniques to patients for the treatment of LUTS/BPH. (*Conditional Recommendation; Evidence Level: Grade C*)

The Panel recognizes AEEP as a surgical technique that can be performed using various technologies (ie, bipolar, diode laser, thulium fiber laser, potassium titanyl phosphate [KTP]/lithium triborate [LBO] Laser) and techniques to achieve a similar intraoperative outcome.[19-22] Unfortunately, the Panel also recognizes that individual technologies and techniques carry their own unique risks, therefore, patients should be counseled about the limited short- and long-term data when utilizing technologies that have limited reporting on comparative information available. The decision to perform these procedures must be based on the expertise and experience of the clinician as well as equipment availability.

Simple Prostatectomy

Clinicians should offer simple prostatectomy with either an open, laparoscopic, or robotic approach as an option for patients with prostates >80 cc for the treatment of LUTS/BPH. (*Moderate Recommendation; Evidence Level: Grade B*)

Simple prostatectomy has a long history in the enucleation of large prostates and also affords the ability to address concomitant pathologies, including bladder stones and/or bladder diverticula, or other reconstructive needs. In RCTs, open simple prostatectomy (OSP) achieved better quality of life and superior PVR bladder volume compared to TURP, but with potential for more bleeding.[19,23] Laparoscopic and robotic approaches, have further advanced the procedure through facilitating same-day discharge, less blood loss, and expanding access to the procedure through extraperitoneal or transvesical, single-port surgery.[24,25]

Prostatic Urethral Lift

Clinicians should offer prostatic urethral lift (PUL) as an option for patients with prostates 30-80 cc without an obstructing median lobe for the treatment of LUTS/BPH. (*Moderate Recommendation; Evidence Level: Grade B*)

The L.I.F.T. study compared PUL to sham in 206 patients. It excluded patients with a prostate volume < 30 cc, > 80 cc, or those who had an obstructive median lobe. Compared to sham, PUL had greater improvement in International Prostate Symptom Score (IPSS), maximum urinary flow rate (Q_{max}), and quality of life scores.[26]

Recent evidence has supported the U.S. Food and Drug Administration (FDA) to grant approval of PUL for prostates up to 100 cc and those with an obstructing median lobe; however, the Panel recommends this should only be considered in appropriate patients and by clinicians with sufficient procedural experience/expertise.[27-29]

Prior to proceeding with PUL, clinicians should counsel patients with LUTS/BPH that this procedure involves implanting permanent tines that may impact future procedures and future imaging of the prostate. (*Expert Opinion*)

Clinicians should recognize PUL may affect the interpretation of imaging modalities used in active surveillance protocols such as multiparametric magnetic resonance imaging (mpMRI) of the prostate. Benidir et al reported that 40% of prostate magnetic resonance imagings (MRIs) in patients with prior PUL were limited by poor quality and/or moderate artifact.[30]

Water Vapor Thermal Therapy

Clinicians should offer water vapor thermal therapy (WVTT) as an option for patients with prostates 30-80 cc for the treatment of LUTS/BPH. (*Moderate Recommendation; Evidence Level: Grade B*)

WVTT is a procedure that is feasible in-office under local anesthesia or in other settings with sedation for 30-80 cc prostates which may include a median lobe. In appropriately selected patients, the IPSS and quality of life score improvements from WVTT remain durable from 3 months through 5 years with no significant differences in erectile function or PVR bladder volume.[31] Recent evidence supported expansion of the FDA-indications for prostates up to 150 cc; however, the Panel recommends this should only be considered in appropriate patients and by clinicians with sufficient procedural experience/expertise.[32,33]

Robotic Waterjet Treatment

Clinicians should offer robotic waterjet treatment (RWT) as an option for patients

with prostates 30-80 cc for the treatment of LUTS/BPH. (*Moderate Recommendation: Evidence Level: Grade B*)

RWT is a tissue-destructive technique that removes tissue by way of a waterjet, via one or multiple passes, to resect tissue and is commonly followed by a limited TURP to obtain hemostasis. In the WATER trial, the mean improvements in IPSS and quality of life through 1, 2, 3, and 5 years were similar between the RWT and TURP groups.[34-38] PVR improvement also remained durable at the 5-year mark, with improvements in both RWT and TURP (62 mL and 82 mL, respectively).[38] While urinary complications and ≥Grade 2 adverse events were similar across groups, procedure-related anejaculation was less frequent for RWT compared to TURP (10% vs 36%; $P = .0003$) at 6 months.[34]

Clinicians may offer RWT as an option for patients with prostates 80-150 cc for the treatment of LUTS/BPH. (*Expert Opinion*)

The WATER II trial was a prospective, open-label trial with men with prostates 80-150 cc and up to 5 years follow-up. The study showed a significant durable improvement in IPSS and quality of life scores, with a reduction of 15.9 points and 3.3 points at 5 years, respectively. There were also significant and durable improvements in uroflowmetry with an average improvement in Q_{max} of 9.2 mL/s at 5 years. The retreatment rate was relatively low, with 6% of patients getting placed on medical therapy and an additional 3% of patients requiring surgical retreatment.[39] EjD was reported to be 19% in sexually active men at 12 months, with limited information beyond this 12-month period.[40] Given the lack of a comparator in these studies, counseling should reflect that comparative efficacy and durability are unknown. Evidence for RWT for prostates > 150 cc is limited, therefore the Panel cannot provide any guidance for the use of RWT in these cases.

Temporary Implantable Prostate Device

Clinicians may offer temporary implantable prostate device (TIPD) as an option for patients with prostates 25-75 cc without an obstructing median lobe for the treatment of LUTS/BPH. (*Expert Opinion*)

TIPD is a device placed by transurethral approach to exert pressure to reshape the prostate and bladder neck. TIPD was compared to a sham procedure.[41] Prostate volumes were restricted to 25-75 cc and the absence of an "obstructive median lobe" was an inclusion criterion. An improvement in the IPSS of at least 3 points post-procedure was reported in 78.6% of the TIPD group and 60.0% of the sham group ($P = .03$). Mean change in IPSS at 3 months was 9.0 points in the TIPD group and 6.6 points in the sham group, which was not statistically different between groups ($P = .06$). The responder analysis (defined as IPSS improvement of ≥ 7 points) was performed at 12 months and demonstrated a responder rate of 72.6% in the TIPD group compared to 50% in the sham group ($P = .048$). There were few related serious adverse events but more overall adverse events, within the first 30 days, in the TIPD group than the sham group (38.1% vs 17.5%).

Intraprostatic Drug Coated Balloon

Clinicians may offer intraprostatic drug coated balloon (IPDCB) as an option for patients with prostates 20-80 cc, a prostatic urethral length 32-55 mm, and without an obstructing median lobe for the treatment of LUTS/BPH. (*Conditional Recommendation; Evidence Level: Grade C*)

Established under outpatient sedation, but possible under local anesthetic, the IPDCB is a treatment validated in 20-80 cc prostates having a 32-55 mm prostatic urethral length, without a median lobe. It is a two-stage procedure, first utilizing a temporary dilating balloon followed by a second paclitaxel-coated balloon.[42] Compared to sham, IPDCB provided significantly greater improvement in IPSS from 3-12 months, with no significant differences in sexual function.[42] Improvements from baseline IPSS and quality of life scores as well as objective measures of uroflowmetry and PVR bladder volume appear stable through 2 years of non-controlled observation.[43]

Prostate Artery Embolization

Clinicians may offer prostate artery embolization (PAE) with particle embolics as an option for patients with prostates ≥50 cc for the treatment of LUTS/BPH. (*Conditional Recommendation; Evidence Level: Grade B*)

There is accumulating evidence that demonstrates PAE's ability to improve LUTS/BPH. Comparing PAE to TURP noted similar IPSS improvements in both the short-term follow-up outcomes (≤ 12 months) and long-term follow-up outcomes (up to 24 months). Notably, PAE was associated with a higher retreatment rate compared to TURP.[44]

In a comparison of PAE to sham, PAE demonstrated a clear improvement in IPSS and quality of life when compared to sham.[44] PAE improvement over medical management has been assessed in 2 small clinical trials, PARTEM[45] and P-EASY trials.[46] Both trials demonstrated that PAE outperformed combined medical therapy with improvements in quality of life in both IPSS and International Index of Erectile Function (IIEF)-15 metrics.

Functional outcomes were evaluated with a recent RCT comparing PAE to OSP in patients with

prostates > 80 cc. Despite equal improvements in IPSS, OSP was superior in improving functional measures (ie, Q_{max} and urodynamic studies [UDS]) than PAE, with 82.6% of PAE patients remaining obstructed despite similar improvements in both PVR and IPSS.[47] Studies such as these underscore the need to continue to follow patients after PAE despite clinical improvements.

The PAE trials that informed this Guideline recommendation have been conducted using particle embolics. There is growing interest in the use of liquid or "glue" embolic PAE. However, at this time there is limited quality prospective evidence on the use of liquid embolic PAE and its efficacy and safety remain unknown.

Urologists should assess patients with LUTS/BPH who are considering PAE prior to the procedure. (*Expert Opinion*)

Proper patient selection is critical to ensure appropriate use of PAE and ensure successful patient outcomes. This includes a full urologic evaluation to confirm LUTS/BPH and exclude other possible etiologies of LUTS.

PAE should be performed in patients with LUTS/BPH by interventional radiologists specifically trained in PAE. (*Expert Opinion*)

PAE is a technically challenging procedure due to the complex vascular anatomy and the need to not only identify the prostatic arteries, but to catheterize and safely perform selective bilateral embolization. This requires interventional radiologists trained in both general angiographic, microcatheter, and embolic techniques as well as fundamental angiographic knowledge of pelvic vasculature in order to identify vesicle, rectal, and penile arteries to prevent non-target embolization and optimize bilateral PAE.

Clinicians should counsel patients with LUTS/BPH that PAE exposes them to radiation. (*Clinical Principle*)

PAE is unique as it is the only BPH treatment which requires radiation exposure to the patient. The level of radiation exposure may be dependent on factors such as interventional radiologist experience, collimation, the use of a cone-beam computed tomography (CT), and novel imaging techniques.

Other Ablative Therapies of the Prostate

Clinicians should not offer high-intensity focused ultrasound (HIFU) ablation/cavitation or cryoablation to patients for the treatment of LUTS/BPH outside the context of a clinical trial. (*Expert Opinion*)

With the growing utilization and expansion of focal technologies for prostate cancer, there has been a rising interest in expanding these technologies for the treatment of BPH. These technologies include HIFU ablation/cavitation and cryoablation of benign prostatic tissues. Although there may be a role for these technologies in LUTS/BPH, the Panel feels that these technologies are still evolving and should not be used for the sole treatment of LUTS/BPH outside of a clinical trial.

SPECIAL CASES

Acute Urinary Retention

In patients with catheter-dependent urinary retention, taking into consideration patient comorbidities, clinicians should recommend resective technologies. (*Expert Opinion*)

Men with catheter-dependent urinary retention caused by obstruction from benign enlargement of the prostate can benefit from surgical intervention to relieve their retention. Resective technologies are those that actively remove prostate tissue at the time of surgery and effectively debulk the prostate and may provide men the highest chance to be catheter-free. Patient comorbidities should be considered prior to proceeding with resective therapy.

Primary Bladder Neck Obstruction

In patients with a suspected primary bladder neck obstruction (PBNO), clinicians may offer TUIP, transurethral resection of the bladder neck (TURBN), or TIPD. (*Expert Opinion*)

PBNO is a dysfunction of the bladder neck, where either the bladder neck is too narrow or fails to open properly for normal voiding. There is unfortunately limited long-term data about outcomes in this population, therefore the Panel focused the recommendation on the procedural options for PBNO to procedures with the ability to disrupt the bladder neck while minimizing harm.

Medically Complicated Patient

For patients who are at high risk of bleeding or require anticoagulant/antiplatelet (AC/AP) medications during BPH procedures, clinicians may offer HoLEP, ThuLEP, PVP, or PAE as treatment options. (*Expert Opinion*)

As the population ages, we are seeing an increasing number of men with BPH who are on AP and/or AC therapy which poses a significant challenge when considering surgical intervention. Laser treatments for BPH (ie, HoLEP, ThuLEP, PVP) are associated with a lower rate of blood transfusion when compared to TURP.[15-18,48] HoLEP, ThuLEP, and PVP have all been utilized as surgical treatments for BPH in patients on AC/AP therapy.[49-51] PAE can also be considered for treatment of LUTS/BPH in patients at high risk of bleeding or requiring AC/AP medications. PAE has demonstrated efficacy in elderly, frail patients with medical comorbidities who are more likely to be on AC/AP therapy.[52]

Concurrent LUTS/BPH and Prostate Cancer Active Surveillance

Clinicians may offer procedural BPH treatment to patients on active surveillance for prostate cancer who have LUTS/BPH. (*Expert Opinion*)

Men on active surveillance for prostate cancer often experience symptomatic BPH and may be offered BPH procedures with the goal of improving quality of life through treatment of LUTS/BPH. Resective technologies such as TURP, simple prostatectomy, AEEP, RWT, and PVP will result in a greater decline in prostate-specific antigen (PSA) and may produce a pathologic tissue specimen that may result in a change in prostate cancer treatment.[53,54]

While other minimally invasive surgical therapies (ie, PUL, WVTT, TIPD, PAE, IPDCB) have been used to treat symptomatic BPH in men on active surveillance for prostate cancer, their impact on PSA and subsequent prostate cancer treatment is not well characterized.

FUTURE DIRECTIONS

Male LUTS and BPH are an ever-evolving landscape and represent a major health issue affecting millions of men worldwide. Despite extensive research, there are still substantial gaps in knowledge, with multiple areas ripe for intervention and discovery.

Novel Mechanisms

Contemporary basic science and translational researchers continue to explore how factors like inflammation, fibrosis, and estrogen predict symptomatology and treatment response. Hopefully future research will continue to help us understand the biology and physiology of the aging prostate and bladder, and the interaction of these 2 entities. Since it is clear that prostate pathophysiology does not invariably lead to LUTS, resiliency factors that protect men from manifesting the symptoms or complications of BPH should be identified.

Expanded Role for New Diagnostics and Stratification of Current Voiding Dysfunction

The utility of multi-channel UDS has been widely debated with many believing that UDS is not necessary in this patient population. With the growth of at-home uroflowmetry and ambulatory UDS systems, we have a newfound ability to recreate a natural setting for our patients to help drive diagnosis. Additionally, with the improvement in our imaging modalities, it may be possible to characterize specific tissue to guide treatment decisions more effectively. The goal of these new diagnostics should be to identify patients who are most likely to respond to certain medications or technologies, while also identifying potential non-responders, thereby minimizing potential delays or selection of inappropriate interventions.

Quantifying Risk of Poor BPH Outcomes and Preventable BPH Complications

Despite decades of research successfully identifying a multitude of risk factors for clinical BPH progression, particularly LUTS progression and acute urinary retention (AUR), there is still a major gap in knowledge regarding how to quantify an individual's risk of poor BPH outcomes and whether pre-emptive treatment regardless of symptom severity can prevent BPH complications, including end-stage bladder.

Incorporation of New Treatments

Modern urologists are blessed with a growing variety of procedural options for BPH. The area of most active development in novel therapies for LUTS/BPH is in prostate stents. Both temporary and permanent stents are in development in a variety of configurations and sizes. A few have made it through the rigors of FDA testing and clinicians should be ready for the tsunami of studies on these varied devices.

Additionally, transperineal laser ablation of the prostate (TPLA) has also been used for the isolated treatment of LUTS/BPH and has been compared to TURP and WVTT with favorable results.[55,56] More information on this technology is needed as there is still significant heterogeneity in the technical aspects of the procedure as well as the optimal patient characteristics and protocol.

Overall, the incorporation of new technologies in our BPH menu has pushed urologists to better understand how patient factors affect treatment options and outcomes. Future studies should carefully define patient populations to better understand the important relationship between variable prostate morphologies and the response to specific treatments.

Artificial Intelligence

While artificial intelligence (AI) and machine learning applications in BPH management remain investigational, future Guidelines may consider emerging evidence related to AI-assisted risk stratification, imaging interpretation, and treatment outcome prediction as these tools may eventually support more personalized management strategies.

Targeting Obesity, Metabolic Syndrome, and Physical Inactivity

Research has already found strong evidence of obesity, abdominal adiposity, and obesity-related comorbidities as predictors of poor LUTS and BPH outcomes.[57] However, there is a lack of high-quality clinical trials testing the efficacy of various behavioral and lifestyle interventions for BPH, such as physical activity or weight loss.

Healthcare Disparities. While prostate-specific research has focused primarily on cancer outcomes and specific differences in screening based on race, this BPH Guideline does not make any of these recommendations. Hopefully with a better understanding of the dynamics between race or ethnicity and BPH outcomes, future BPH Guidelines will be able to provide further guidance based on these patient characteristics.

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