Surgical Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: AUA Guideline Amendment 2020

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Purpose: The AUA Guideline panel provides evidence-based recommendations for the surgical management of male lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH).

Materials and Methods: The Panel amended the Guideline in 2020 to reflect additional literature published through September 2019. When sufficient evidence existed, the Panel assigned the body of evidence a strength rating of A (high), B (moderate), or C (low) for support of Strong, Moderate, or Conditional Recommendations. In the absence of sufficient evidence, the Panel provided additional information as Clinical Principles and Expert Opinions (See table 1).

Results: Amendments to these Guidelines include: 1) an amended statement (Guideline 1) to include conducting a physical examination; 2) a new statement (Guideline 6) discussing concepts of treatment failure and retreatment; 3) an amended statement (Guideline 15) with updated supporting text for prostatic urethral lift (PUL); 4) an amended statement (Guideline 16) for PUL; 5) an amended statement (Guideline 17) with updated supporting text for transurethral microwave therapy (TUMT); 6) an amended statement (Guideline 18) with updated supporting text for water vapor thermal therapy; 7) updated supporting text for water vapor thermal therapy (Guideline 19); 8) an amended statement (Guideline 21) with updated supporting text for laser enucleation; 9) an amended statement (Guideline 22) with updated supporting text for Aquablation; and 10) an amended statement (Guideline 23) with updated supporting text for Prostate Artery Embolization (PAE).

Conclusions: These evidence-based updates to the AUA Guidelines further inform the surgical management of LUTS/BPH.

Key Words: transurethral resection of the prostate, laser therapy, lower urinary tract symptoms, prostate

Abbreviations and Acronyms

AUA = American Urological Association

BPE = Benign Prostatic Enlargement

BPH = Benign Prostatic Hyperplasia

HoLEP = Holmium Laser Enucleation of the Prostate

LUTS = Lower Urinary Tract Symptoms

LUTS/BPH = Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia

PAE = Prostate Artery Embolization

PUL = Prostatic Urethral Lift

RCT = Randomized Control Trial

ThuLEP = Thulium Laser Enucleation of the Prostate

TURP = Transurethral Resection of the Prostate

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BPH is a histologic diagnosis that refers to the proliferation of glandular epithelial tissue, smooth muscle, and connective tissue within the prostatic transition zone.[1] BPH is common in the aging male. The prevalence increases with age.[2]

Asymptomatic BPH does not require treatment. However, BPH can lead to an enlargement of the prostate (benign prostatic enlargement [BPE]). BPE may cause functional obstruction of the bladder outlet (benign prostatic obstruction), which may induce lower urinary tract symptoms (LUTS), urinary infections, bladder stones, and other conditions. Lower urinary tract obstruction may also be caused by

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Table 1: *AUA Nomenclature Linking Statement Type to Level of Certainty, Magnitude of Benefit or Risk/Burden, and Body of Evidence Strength*

	Evidence Strength A (High Certainty)	Evidence Strength B (Moderate Certainty)	Evidence Strength C (Low Certainty)
Strong Recommendation (Net benefit or harm substantial)	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is substantial Applies to most patients in most circumstances and future research is unlikely to change confidence	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is substantial Applies to most patients in most circumstances but better evidence could change confidence	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) appears substantial Applies to most patients in most circumstances but better evidence is likely to change confidence (rarely used to support a Strong Recommendation)
Moderate Recommendation (Net benefit or harm moderate)	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is moderate Applies to most patients in most circumstances and future research is unlikely to change confidence	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is moderate Applies to most patients in most circumstances but better evidence could change confidence	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) appears moderate Applies to most patients in most circumstances but better evidence is likely to change confidence
Conditional Recommendation (No apparent net benefit or harm)	Benefits = Risks/Burdens Best action depends on individual patient circumstances Future research unlikely to change confidence	Benefits = Risks/Burdens Best action appears to depend on individual patient circumstances Better evidence could change confidence	Balance between Benefits & Risks/Burdens unclear Alternative strategies may be equally reasonable Better evidence likely to change confidence
Clinical Principle	A statement about a component of clinical care that is widely agreed upon by urologists or other clinicians for which there may or may not be evidence in the medical literature		
Expert Opinion	A statement, achieved by consensus of the Panel, that is based on members clinical training, experience, knowledge, and judgment for which there is no evidence		

other etiologies. This condition is referred to as bladder outlet obstruction.

LUTS increase in frequency and severity with age, and may be caused by a variety of conditions other than BPE-induced obstruction: for example, overactive bladder.[2] In this Guideline, the Panel refers to "LUTS attributed to BPH" (LUTS/BPH) to indicate LUTS among men for whom an alternative cause is not apparent.

Since its publication, a working group of the BPH Guideline panel has regularly amended the 2018 report with emerging clinical data on novel technologies.[3] In contrast to prior BPH Guidelines, between which several years would elapse between updates, this new process provides timely and important information to the urological community on an annual basis.

The Guideline panel provided the Minnesota Evidence Review Team with key questions, interventions, comparators, and outcomes identical to the 2018 process. The review team worked with the panel to refine the scope, key questions, and inclusion/exclusion criteria. The panel noted several topics, interventions and technologies with meaningful peer reviewed publications qualifying for additional statements, discussion and commentary. When the reviewed materials did not impact the 2018 AUA BPH Clinical Guidelines, the statements were left unaltered without additional text.

Additionally, treatment information can be found in the Surgical Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia Algorithm (figure 1).

GUIDELINE STATEMENTS WITH UPDATES

Evaluation and Preoperative Testing

1. In the initial evaluation of patients presenting with bothersome LUTS possibly attributed to BPH, clinicians should take a medical history, conduct a physical examination, utilize the AUA Symptom Index (AUA-SI), and perform a urinalysis. (Clinical Principle)

Language was added to this statement on conducting a physical examination for the initial evaluation of patients presenting with bothersome LUTS possibly due to BPH.

Additionally, supporting text was added for interpreting the results of urinalysis.

General Principles of Retreatment

6. Clinicians should inform patients of the possibility of treatment failure and the need for additional or secondary treatments when considering surgical and minimally-invasive treatments for LUTS secondary to BPH. (Clinical Principle).

Guideline 6 is a new guideline recommending that patients be counseled as to the potential risks of treatment failure and need for additional therapies. The Panel identified several core concepts of treatment failure and retreatment. In addition to patient counseling, the Panel recommends consideration of these five issues when interpreting outcomes of clinical trials comparing different therapeutic modalities, or of clinical trials of a single modality with different lengths of follow-up.

First, rates of treatment failure and retreatment are influenced by both the duration and the

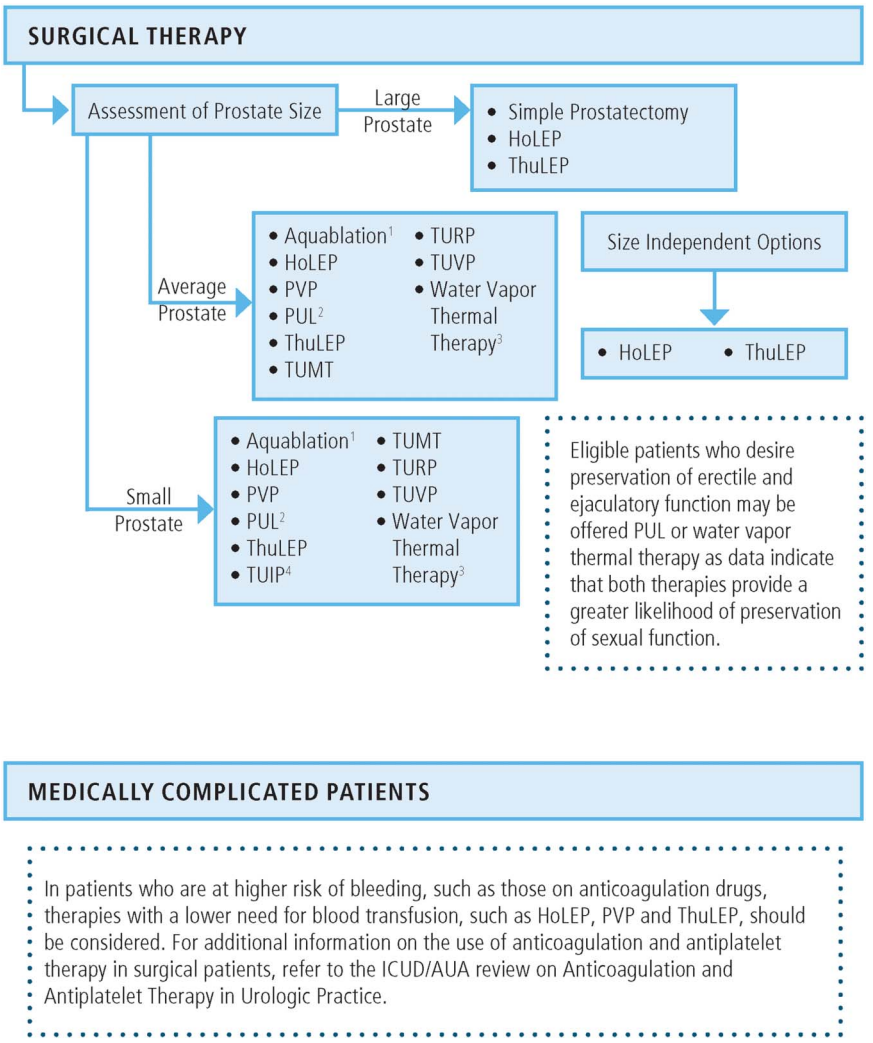

Figure 1.

completeness of follow-up. For the methodological analyses of this guideline, the Panel focused primarily on follow-up duration, a more objective and readily captured metric; and defined durations of post-treatment follow-up as short- (<6 months), intermediate- (6 to 12 months), or longer-term (>12 months). These time intervals were chosen by the Panel at the prior to the literature search based on the available literature at that time.

Second, the risks of objective (e.g., urinary retention, reduction of flowrate, increasing residual urine, infection) and subjective failure (e.g., worsening of IPSS and/or quality of life) increase with longer duration of follow-up.

Third, retreatment may take the form of medical therapy, a minimally-invasive intervention, or a surgical procedure.

Fourth, thresholds for—and types of—retreatment may vary substantially by provider, patient, category of failure (i.e. objective, subjective, or both), and initial treatment modality.

Finally, in contrast to retreatment with minimally-invasive and newer surgical therapies, including but not limited to Water Vapor Thermal Therapy and PUL, most older clinical trials do not routinely report retreatment with medical therapy as an outcome. The difficulty of accurately recording initiation and duration of medical therapy precludes

routine assessment. This pattern may lead to underreporting of medical retreatment relative to minimally invasive and surgical retreatments, for which there are clearly definable timepoints at which retreatment takes place.

In addition, the Panel defined and discussed specific concepts of retreatment for photoselective vaporization of the prostate, prostatic urethral lift (PUL), transurethral microwave therapy (TUMT), water vapor thermal therapy, laser enucleation, and Aquablation. These concepts are detailed in the supporting statement of Guideline 6.[4]

Prostatic Urethral Lift (PUL)

15. PUL may be offered as an option for patients with LUTS attributed to BPH provided prostate volume <80g and verified absence of an obstructive middle lobe. (Moderate Recommendation; Evidence Level: Grade C).

The following phrases were removed from the statement and supporting text "however, patients should be informed that symptom reduction and flow rate improvement is less significant compared to TURP. Patients should be informed that evidence of efficacy and retreatement rates are poorly defined."

The supporting text was revised to clarify the results of two RCTs: the BPH6 Study and the L.I.F.T study.[5,6]

16. PUL may be offered to eligible patients who desire preservation of erectile and ejaculatory function. (Conditional Recommendation; Evidence Level: Grade C).

Wording for this statement regarding preservation of erectile and ejaculatory function was edited for clarity. There were no changes to the supporting text of this statement.

Transurethral Microwave Therapy (TUMT)

17. TUMT may be offered to patients with LUTS attributed to BPH. (Conditional Recommendation; Evidence Level: Grade C).

The following phrase was removed from the statement and supporting text: "however, patients should be informed that surgical retreatment rates are higher compared to TURP." This information is now included in Statement 6.

Water Vapor Thermal Therapy

18. Water vapor thermal therapy may be offered to patients with LUTS attributed to BPH provided prostate volume <80g. (Moderate Recommendation; Evidence Level: Grade C).

The following phrase was removed from the statement and supporting text: "however, patients should be counseled regarding efficacy and retreatment rates." This information is now included in Statement 6.

19. Water vapor thermal therapy may be offered to eligible patients who desire preservation of erectile and ejaculatory function. (Conditional Recommendation; Evidence Level: Grade C).

Changes were made to the supporting text to reflect updated information from an RCT comparing water vapor thermal therapy to sham.[7]

Laser Enucleation

21. Clinicians should consider HoLEP or ThuLEP, depending on their expertise with either technique, as prostate size-independent options for the treatment of LUTS attributed to BPH. (Moderate Recommendation; Evidence Level: Grade B).

Changes were made to the supporting text to include data from recent publications.[8]

Aquablation

22. Aquablation may be offered to patients with LUTS attributed to BPH provided prostate volume >30/<80g. (Conditional Recommendation; Evidence Level: Grade C).

The following phrase was removed from the statement and supporting text: "however, patients should be informed that long term evidence of efficacy and retreatment rates, remains limited." This information is now included in Statement 6.

Prostate Artery Embolization (PAE)

23. PAE for the treatment of LUTS secondary to BPH is not supported by current data and trial designs, and benefit over risk remains unclear; therefore, PAE is not recommended outside the context of clinical trials. (Expert Opinion).

The statement was edited to include the following phrase: "PAE for the treatment of LUTS secondary to BPH is not supported by current data and trial designs, and benefit over risk remains unclear."

Additional changes were made to the supporting text to reflect updated information.

FUTURE DIRECTIONS

There are enormous gaps in knowledge and, therefore, ensuing opportunities for discovery. These include but are not limited to many unanswered questions related to the role of inflammation, metabolic dysfunction, obesity, and environmental factors in etiology, as well as the role of behavior modification, self-management, and evolving therapeutic algorithms in both the prevention and progression of disease. New technologies will continue to emerge and require further investigation as to efficacy and their unique positions in the surgical BPH armentarium. Evaluation of which modalities may be of greater benefit to which patients and comparison of these against each other are areas of great interest to surgeons and as such, offer an

opportunity for study. A BPH calculator that could allow providers to enter patient characterizations and then receive recommended options would give a tool to urologists to help them navigate the ever-expanding procedural based treatment options. For investigators interested in scientific discovery, be it cellular to surgical, BPH provides an area with much left to learn and understand.

DISCLAIMER

This document was written by the Benign Prostatic Hyperplasia Guideline Panel of the American Urological Association Education and Research, Inc., which was created in 2016. The Practice Guidelines Committee (PGC) of the AUA selected the committee chair. Panel members were selected by the chair. Membership of the Panel included specialists in urology and primary care with specific expertise on this disorder. The mission of the panel was to develop recommendations that are analysis based or consensus-based, depending on panel processes and available data, for optimal clinical practices in the treatment of early stage testicular cancer. Funding of the panel was provided by the AUA. Panel members received no remuneration for their work. Each member of the panel provides an ongoing conflict of interest disclosure to the AUA, and the Panel Chair, with the support of AUA Guidelines staff and the PGC, reviews all disclosures and addresses any potential conflicts per AUA's Principles, Policies and Procedures for Managing Conflicts of Interest. While these guidelines do not necessarily establish the standard of care, AUA seeks to recommend and to encourage compliance by practitioners with current best practices related to the condition being treated. As medical knowledge expands and technology advances, the guidelines will change. Today these evidence-based guidelines statements represent not absolute mandates but provisional proposals for treatment under the specific conditions described in each document. For all these reasons, the guidelines do not pre-empt physician judgment in individual cases. Treating physicians must take into account variations in resources, and patient tolerances, needs, and preferences. Conformance with any clinical guideline does not guarantee a successful outcome. The guideline text may include information or recommendations about certain drug uses ('off label') that are not approved by the Food and Drug Administration (FDA), or about medications or substances not subject to the FDA approval process. AUA urges strict compliance with all government regulations and protocols for prescription and use of these substances. The physician is encouraged to carefully follow all available prescribing information about indications, contraindications, precautions and warnings. These guidelines and best practice statements are not intended to provide legal advice about use and misuse of these substances. Although guidelines are intended to encourage best practices and potentially encompass available technologies with sufficient data as of close of the literature review, they are necessarily time-limited. Guidelines cannot include evaluation of all data on emerging technologies or management, including those that are newly FDA-approved or amended, which may immediately come to represent accepted clinical practices. For this reason, the AUA does not regard technologies or management which are too new to be addressed by this guideline as necessarily experimental or investigational.

CONFLICT OF INTEREST DISCLOSURES

All panel members completed COI disclosures. Disclosures listed include both topic- and non-topic-related relationships. 2018 Panel: Consultant/Advisor: Kevin T. McVary, MD: AMS/Boston Scientific, Merck, Olympus; Michael J. Barry, MD: US Preventive Services Task Force; Steven A. Kaplan, MD: Astellas, proverum, ProArc, Zenflow, Serenity, Allium, Avadel, Nymox; J. Kellogg Parsons, MD: MDx Health, Endocare; Lori B. Lerner, MD: Boston Scientific; Claus G. Roehrborn, MD: Glaxo Smith Kline, Protox, Neotract, NERI, Procept Biorobotics, Boston Scientific, nymox; Charles Welliver, MD: Coloplast. Meeting Participant or Lecturer: Tobias S. Kohler, MD: Coloplast; Lori B. Lerner, MD: Lumenis, Inc. Scientific Study or Trial: Kevin T. McVary, MD: Astellas, NIDDK; Michael J. Barry, MD: Healthwise; Tobias S. Kohler, MD: American Medical Systems; Claus G. Roehrborn, MD: Southwest Oncology Group, CALGB Clinical Trial Group, Nxthera, Astellas; Charles Welliver, MD: Procept Biorobotics, Auxillium, Mereo. Leadership Position: Steven A. Kaplan, MD: Medivizor, EcoFusion, AvantCourse. Health Publishing: Deborah J. Lightner, MD: AUA, Urology/Elsevier; Claus G. Roehrborn, MD: NIDDK. Other: Lori B. Lerner, MD: Procept; Charles Welliver, MD: BMJ Best Practice, Oakstone Publishing, Amgen. 2019 Amendment: Consultant/Advisor: Kevin T. McVary, MD: AMS/Boston Scientific, Merck, Olympus; Lori B. Lerner, MD: Boston Scientific; Kellogg Parsons, MD: MDx Health, Endocare. Meeting Participant or Lecturer: Tobias S. Kohler, MD: Coloplast; Lori B. Lerner, MD: Lumenis, Inc., Neotract, Augmentix. Scientific Study or Trial: Kevin T. McVary, MD: Astellas, NIDDK, SRS Medical Systems; Tobias S. Kohler, MD: American Medical Systems. Leadership Position: Kevin T. McVary, MD: Uronext. Other: Lori B. Lerner, MD:

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