

2017

GUIDELINES AT-A-GLANCE

A Quick Reference for Urologists

A QUICK REFERENCE FOR UROLOGISTS — 2017

CURRENT GUIDELINES ON:

- Antimicrobial Prophylaxis
- Asymptomatic Microhematuria
- Benign Prostatic Hyperplasia
- Bladder Cancer: Muscle Invasive
- Bladder Cancer: Non-Muscle Invasive
- Cryptorchidism
- DVT: Prevention in Patients Undergoing Urologic Surgery
- Erectile Dysfunction
- Follow-up for Clinically Localized Renal Neoplasms
- IC/BPS
- Male Infertility
- Male Urethral Stricture
- Overactive Bladder
- Peyronie's Disease
- Premature Ejaculation
- Priapism
- Prostate Cancer: Castration-Resistant
- Prostate Cancer: Early Detection
- Prostate Cancer: Localized
- Prostate Cancer: Radiotherapy After Prostatectomy
- Prostate Specific Antigen
- Renal Mass
- Stones: Medical Management
- Stones: Surgical Management
- Stress Urinary Incontinence
- Urodynamics
- Urotrauma
- Vasectomy
- Vesicoureteral Reflux

CURRENT BEST PRACTICE STATEMENTS ON:

- Antimicrobial Prophylaxis for Urologic Surgery
- Deep Vein Thrombosis
- Male Infertility
- PSA Testing

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DEAR READER,

This *Guidelines-At-A-Glance* pocket guide contains essential summarized information from a number of AUA Guidelines Department documents. The evidence-based guidelines and best practice statements from which this information is derived were developed by multidisciplinary panels of leading physicians and other health experts and underwent extensive peer review prior to publication. The content of these guidelines and best practice statements is reviewed every 12 to 36 months to ensure timeliness and accuracy. This ready reference tool will provide up-to-date, evidence-based statements, expert clinical opinion, and pertinent information to help practicing urologists and other clinicians provide optimal patient care.

Sincerely,

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May 1, 2017

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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 in-tended 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 at the 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 FDA-approved, which may immediately come to represent accepted clinical practices.

For this reason, the AUA does not regard technologies or management that are too new to be addressed by this guideline as necessarily experimental or investigational.

Each topic in this pocket guide was developed as a summary of the full AUA guideline or best practice statement for that particular subject. The full AUA guideline or best practice statement on each topic should be consulted as the final authority.

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 To order or download patient education materials on this topic from the Urology Care Foundation, visit UrologyHealth.org.

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ANTIMICROBIAL PROPHYLAXIS

Best Practice Statement (2008); Reviewed and Validity Confirmed (2011); Update (2012)

Efforts currently are centered on improving patient safety and reducing costs by standardizing antimicrobial prophylaxis and encouraging proper application including timing of administration and duration of prophylaxis. The following recommendations should help initiate the decisions regarding use of antimicrobial prophylaxis in urologic surgery, the selection of agent, and determination of appropriate dosing while considering the patient's specific circumstances.

Principles of Surgical Antimicrobial Prophylaxis

- Surgical antimicrobial prophylaxis is the periprocedural systemic administration of an antimicrobial agent intended to reduce the risk of postprocedural local and systemic infections.
- The potential benefit of surgical antimicrobial prophylaxis is based on:
 - ✦ Patient-related factors (ability of the host to respond to bacterial invasion) (Table 1). These factors can be additive, compounding their impact.
 - ✦ Procedural factors (likelihood of bacterial invasion at the operative site) (Table 2). Urinary procedures are considered "clean-contaminated."
 - ✦ The potential morbidity of infection.
- Surgical antimicrobial prophylaxis is recommended only when the potential benefit exceeds the risks and anticipated costs.

- The antimicrobial agent used for prophylaxis should be effective against the disease-relevant bacterial flora characteristic of the operative site. Cost, conveniences and safety of the agent also should be considered.
- The duration of surgical antimicrobial prophylaxis should extend throughout the period in which bacterial invasion is facilitated and/or is likely to establish an infection.
 - ◆ Begin infusion of the first dose within 60 minutes of the surgical incision (with the exception of 120 minutes for intravenous fluoroquinolones and vancomycin).
 - ◆ Do not extend prophylaxis beyond 24 hours after a procedure except when a prosthetic material is being placed, an external urinary catheter is present prior to or is placed at the time of the procedure in patients with certain risk factors, or with documented bacteriuria.
 - ◆ With an existing infection, a therapeutic course of antimicrobials should be administered in an attempt to sterilize the field or at least to suppress the bacterial count. If urine culture shows no growth, prophylaxis can be omitted.

Antimicrobial Prophylaxis Recommendations

Patients Undergoing Urologic Surgery

- Antimicrobial prophylaxis for genitourinary procedures solely to prevent infectious endocarditis is no longer recommended by the American Heart Association; the risk of adverse events exceeds the benefit.
- The efficacy of oral fluoroquinolones for prophylaxis is unique to urologic surgical procedures.
- Choose an antimicrobial agent that is effective against the disease – relevant bacterial flora characteristic of the operative site. Consider cost, convenience and safety of the agent.
 - ◆ Tables 3, 4 and 5 provide specific recommendations for the settings in which antimicrobial prophylaxis is indicated and the agents of choice.
 - ◆ The agent should achieve serum and tissue levels that exceed the minimum inhibitory concentration of the organism characteristic of the operative site, have a long half-life, and be safe, inexpensive and not likely to promote bacterial resistance. For the urinary tract, the cephalosporins, oral fluoroquinolones and aminoglycosides generally meet these criteria.
 - ◆ Absence of an agent from the Tables should not preclude its appropriate use, depending on the situations such as: medication intolerance, agent compatibility, prior infection and community resistance patterns.
 - ◆ In some cases, prophylaxis should be limited to patients with specific risk factors.
 - ◆ For surgical prophylaxis, all antimicrobials should be administered IV except for the oral administration for fluoroquinolones, trimethoprim-sulfamethoxazole, bowel preparation agents and some agents given at catheter removal; in addition, intramuscular administration for antimicrobials for transrectal prostate biopsy is acceptable.
- Table 6 presents standard dosing regimens; however, more frequent dosing may be needed. Adjust some drug doses to the patient's body weight (or corrected dosing weight) or body mass index. Additional doses are required intraoperatively if the procedure extends beyond two half-lives of the initial dose.

Patients with Orthopedic Considerations

- Use antimicrobial prophylaxis to reduce risk of the following:
 - ✦ Hematogenous total joint infection in patients who meet both sets of criteria in Table 7.
 - ✦ Other infections in some patients who do not meet both sets of criteria in Table 7.
- Do not use antimicrobial prophylaxis:
 - ✦ On the basis of orthopedic pins, plates and screws.
 - ✦ For total joint replacement on that basis alone.
- The recommended antimicrobial regimen:
 - ✦ A single systemic level dose of a fluoroquinolone orally one to two hours preoperatively.
 - ✦ Ampicillin 2 g IV (or vancomycin 1 g IV in penicillin allergic patients, over one to two hours) plus gentamicin 1.5 mg/kg IV 30 to 60 minutes preoperatively.
 - ✦ Consider additional or alternative agents against specific organisms and/or other infections.

TABLE 1.

Patient-related Factors Affecting Host Response To Surgical Infections

Factor	Result
Impair natural defense mechanisms	
Advanced age Anatomic anomalies of the urinary tract Poor nutritional status Smoking Chronic corticosteroid use Immunodeficiency	↓ natural defense mechanisms of the urinary tract and immune system
Increase local bacterial concentration and/or spectrum of flora	
Externalized catheters Colonized endogenous/exogenous material Distant coexistent infection Prolonged hospitalization	↑ local bacterial concentration and/or spectrum

Modified from Schaeffer AJ and Schaeffer EM: Infections of the urinary tract. In: Campbell-Walsh Urology, 9th ed. Edited by AJ Wein, LR Kavoussi, AC Novick, AW Partin and CA Peters. Philadelphia: Saunders-Elsevier 2007; vol 1, pp 223-303. Reprinted with permission from Elsevier Ltd.

TABLE 2.

Surgical Wound Classification

Clean	Uninfected operative site, with primary skin closure
Clean-contaminated	Entry into respiratory, alimentary, genital or urinary tracts
Contaminated	Fresh accidental wounds, major break in sterile technique, gross spillage from gastrointestinal tract or presence of acute but nonpurulent inflammation at the operative site.
Dirty-infected	Old accidental wound with devitalized tissue or presence of clinical infection or perforated viscera at the operative site. This definition implies that organisms that might cause postoperative infection were present at the operative site before surgery.

Adapted from Mangram AJ, Horan TC, Pearson ML, Silver LC and Jarvis WR: Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol* 1999; **20**: 250.

TABLE 3.

Prophylaxis for Lower Tract Instrumentation

Procedure (organisms) ¹	Prophylaxis Indicated	Antimicrobial(s) of Choice ²	Alternative Antimicrobial(s) ²
Removal of external urinary catheter, ^{3,4} (GU tract)	Patients with risk factors ⁵	Fluoroquinolone, Trimethoprim-sulfamethoxazole	Aminoglycoside ± Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate
Cystography, urodynamic study or simple cystourethroscopy (GU tract)	Patients with risk factors ⁵	Fluoroquinolone, Trimethoprim-sulfamethoxazole	Aminoglycoside ± Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate
Cystourethroscopy with manipulation ⁶ (GU tract)	All patients	Fluoroquinolone, Trimethoprim-sulfamethoxazole	Aminoglycoside ± Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate
Prostate brachytherapy or cryotherapy (Skin)	Uncertain	1st gen. Cephalosporin	Clindamycin
Transrectal prostate biopsy (Intestine)	All patients	Fluoroquinolone, 1st/2nd/3rd gen. Cephalosporin	Aminoglycoside + Metronidazole or Clindamycin

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Key: gen., generation; GU, genitourinary.

- 1 Organisms common to the GU tract – *E. coli*, *Proteus sp.*, *Klebsiella sp.*, *Enterococcus*; Intestine – *E. coli*, *Klebsiella sp.*, *Enterobacter*, *Serratia sp.*, *Proteus sp.*, *Enterococcus*, and Anaerobes; Skin – *S. aureus*, *coagulase negative Staph. sp.*, Group A *Strep. sp.*
- 2 Order of agents is not indicative of preference.
- 3 If urine culture shows no growth prior to procedure, antimicrobial prophylaxis is not necessary.
- 4 Or full course of culture-directed antimicrobials for documented infection (treatment not prophylaxis).
- 5 Risk factors-see Table 1.
- 6 Includes transurethral resection of bladder tumor and prostate, and any biopsy, resection, fulguration, foreign body removal, urethral dilation or urethrotomy, or urethral instrumentation including catheterization or stent placement/removal.

TABLE 4.

Prophylaxis for Upper Tract Instrumentation

Procedure (organisms) ¹	Prophylaxis Indicated	Antimicrobial(s) of Choice ²	Alternative Antimicrobial(s) ²
Shock-wave lithotripsy (GU tract)	If risk factors	Fluoroquinolone, trimethoprim-sulfamethoxazole	Aminoglycoside ± Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate
Percutaneous renal surgery (GU tract and skin)	All patients	1st/2nd gen. Cephalosporin, Aminoglycoside + Metronidazole or Clindamycin	Aminoglycoside/Sulbactam Fluoroquinolone
Ureteroscopy (GU tract)	All patients	Fluoroquinolone, trimethoprim-sulfamethoxazole	Aminoglycoside ± Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate

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Key: gen., generation; GU, genitourinary.

- 1 Organisms common to the GU tract – *E. coli*, *Proteus sp.*, *Klebsiella sp.*, *Enterococcus*; Skin – *S. aureus*, coagulase negative *Staph. sp.*, Group A *Strep. sp.*
- 2 Order of agents is not indicative of preference.

TABLE 5.

Prophylaxis for Open or Laparoscopic Surgery

Procedure (organisms) ¹	Prophylaxis Indicated	Antimicrobial(s) of Choice ²	Alternative Antimicrobial(s) ²
Vaginal surgery (GU tract, skin and Group B <i>Strep.</i>)	All patients	1st/2nd gen. Cephalosporin Aminoglycoside + Metronidazole or Clindamycin	Ampicillin/Sulbactam Fluoroquinolone
Involving entry into the urinary tract (GU tract and skin)	All patients	1st/2nd gen. Cephalosporin Aminoglycoside + Metronidazole or Clindamycin	Ampicillin/Sulbactam Fluoroquinolone
Without entering urinary tract (skin)	Patients with risk factors ³	1st gen. Cephalosporin (single dose)	Clindamycin (single dose)
Involving intestine ⁴ (GU tract, skin, and intestine)	All patients	2nd/3rd gen. Cephalosporin, Aminoglycoside + Metronidazole or Clindamycin	Ampicillin/Sulbactam Ticarcillin/Clavulanate Piperacillin/Tazobactam Fluoroquinolone
Involving implanted prosthesis (GU tract and skin)	All patients	Aminoglycoside + 1st/2nd gen. Cephalosporin or Vancomycin	Ampicillin/Sulbactam Ticarcillin/Clavulanate Piperacillin/Tazobactam

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Key: gen., generation; GU, genitourinary.

- 1 Organisms common to the GU tract – *E. coli*, *Proteus sp.*, *Klebsiella sp.*, *Enterococcus*; Intestine – *E. coli*, *Klebsiella sp.*, *Enterobacter*, *Serratia sp.*, *Proteus sp.*, *Enterococcus*, and Anaerobes; Skin – *S. aureus*, coagulase negative *Staph. sp.*, Group A *Strep. sp.*
- 2 Order of agents is not indicative of preference.
- 3 Risk factors - see Table 1.
- 4 For surgery involving colon, bowel preparation with oral neomycin plus either erythromycin base or metronidazole can be added to or substituted for systemic agents.

TABLE 6.

Antimicrobial Agents and Doses for Perioperative Use

Fluoroquinolones	Levofloxacin: 500 mg PO single dose Ciprofloxacin: 500 mg PO [q12h] Ofloxacin: 400 mg PO [q12h]
Aminoglycosides	Gentamicin: 5 mg/kg IV single dose Tobramycin: 5 mg/kg IV single dose Amikacin: 15 mg/kg IV single dose
1st Generation cephalosporins	Cephalexin: 500 mg PO [q6h] Cephadrine: 500 mg PO [q6h] Cefadroxil: 500 mg PO [q12h] Cefazolin: 1 g IV [q8h]
2nd Generation cephalosporins	Cefaclor: 500 mg PO [q8h] Cefprozil: 500 mg PO [q12h] Cefuroxime: 500 mg PO [q12h] Cefoxitin: 1 - 2 g IV [q8h]
3rd Generation cephalosporins (oral agents not listed)	Ceftizoxime: 1 g IV [q8h] Ceftazidime: 1 g IV [q12h] Ceftriaxone: 1 - 2 IV single dose Cefotaxime: 1 g IV [q8h]
Others	Amoxicillin/clavulanate: 875 mg PO [q12h] Ampicillin: 1 - 2 g IV [q6h] Ampicillin/sulbactam: 1.5 - 3 g IV [q6h] Aztreonam 1 - 2 g IV [q8h] Clindamycin: 600 mg IV [q8h] Erythromycin base (for bowel preparation): 1 - 2 g PO [variable] Metronidazole: 1 g IV [q12h]; (for bowel preparation) 1 - 2 g PO [variable] Neomycin (for bowel preparation): 1 - 2 g PO [variable] Piperacillin/tazobactam: 3.375 g IV [q6h] Ticarcillin/clavulanate: 3.1 g IV [q6h] Trimethoprim-sulfamethoxazole: 1 double-strength tablet PO [q12h] Vancomycin: 1 g IV [q12h]

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Key: g, gram; h, hour; IV, intravenous; kg, kilogram; mg, milligram; PO, orally; q, every.

TABLE 7.

Criteria for antimicrobial prophylaxis for patients with orthopedic conditions

Criteria	
Increased risk of hematogenous total joint infection	Increased risk of bacteremia associated with urologic procedures
Within 2 years of prosthetic joint replacement Immunocompromise and prosthetic joint replacement <ul style="list-style-type: none"> • Inflammatory arthropathies (e.g., rheumatoid arthritis, systemic lupus erythematosus) • Drug-induced immunosuppression • Radiation-induced immunosuppression 	Stone manipulation (includes shock-wave lithotripsy) Transmural incision into urinary tract (does not include simple ligation with excision or percutaneous drainage procedure) Endoscopy of upper tract (ureter and kidney) Procedures including bowel segments
Comorbidity <ul style="list-style-type: none"> • Previous prosthetic joint infection • Malnourishment • Hemophilia • HIV infection • Diabetes • Malignancy 	Transrectal prostate biopsy Urinary tract entry (except for urethral catheterization) in individuals with higher risk of bacterial colonization: <ul style="list-style-type: none"> • Indwelling catheter or intermittent catheterization • Indwelling ureteral stent • Urinary retention • History of recent/recurrent urinary tract infection or prostatitis • Urinary diversion

Adapted from American Urological Association; American Academy of Orthopaedic Surgeons: Antimicrobial prophylaxis for urological patients with total joint replacement. *J Urol* 2003; **169**: 1796.

ASYMPTOMATIC MICROHEMATURIA

AUA Guideline (2012)

This guideline's purpose is to provide direction to clinicians and patients regarding how to work up and follow patients with the finding of asymptomatic microhematuria (AMH). The strategies and approaches recommended in this document were derived from evidence-based and consensus-based processes. This document constitutes a clinical strategy and is not intended to be interpreted rigidly. The most effective approach for a particular patient is best determined by the individual clinician and patient. As the science relevant to AMH evolves and improves, the strategies presented here will require amendment to remain consistent with the highest standards of clinical care.

- Asymptomatic microhematuria (AMH) is defined as 3 or greater red blood cells (RBC) per high powered field (HPF) on a properly collected urinary specimen in the absence of an obvious benign cause. A positive dipstick does not define AMH and evaluation should be based solely on findings from microscopic examination of urinary sediment and not on a dipstick reading. A positive dipstick reading merits microscopic examination to confirm or refute the diagnosis of AMH.
- The assessment of the asymptomatic microhematuria patient should include a careful history, physical examination, and laboratory examination to rule out benign causes of AMH, such as infection, menstruation, vigorous exercise, medical renal disease, viral illness, trauma, or recent urological procedures.

- Once benign causes have been ruled out, the presence of asymptomatic microhematuria should prompt a urologic evaluation.
- At the initial evaluation, an estimate of renal function should be obtained (may include calculated eGFR, creatinine, and blood urea nitrogen [BUN]) because intrinsic renal disease may have implications for renal related risk during the evaluation and management of patients with AMH.
- The presence of dysmorphic red blood cells, proteinuria, cellular casts, and/or renal insufficiency or any other clinical indicator suspicious for renal parenchymal disease warrants concurrent nephrologic workup but does not preclude the need for urologic evaluation.
- Microhematuria that occurs in patients who are taking anti-coagulants requires urologic evaluation and nephrologic evaluation regardless of the type or level of anti-coagulation therapy.
- For the urologic evaluation of asymptomatic microhematuria, a cystoscopy should be performed on all patients aged 35 years and older.
- In patients younger than age 35 years, cystoscopy may be performed at the physician's discretion.
- A cystoscopy should be performed on all patients who present with risk factors for urinary tract malignancies (e.g., irritative voiding symptoms, current or past tobacco use, chemical exposures) regardless of age.
- The initial evaluation for AMH should include a radiologic evaluation. Multi-phasic computed tomography (CT) urography (without/with IV contrast), including sufficient phases to evaluate the renal parenchyma to rule out

a renal mass and an excretory phase to evaluate the urothelium of the upper tracts, is the imaging procedure of choice because it has the highest sensitivity and specificity for imaging the upper tracts.

- For patients with relative or absolute contraindications that preclude use of multiphasic CT (such as renal insufficiency, contrast allergy, pregnancy), magnetic resonance urography (MRU) (without/with intravenous contrast) is an acceptable alternative imaging approach.
- For patients with relative or absolute contraindications that preclude use of multiphasic CT (such as renal insufficiency, contrast allergy, pregnancy) where collecting system detail is deemed imperative, combining MRI with retrograde pyelograms (RPGs) provides alternative evaluation of the entire upper tracts.
- For patients with relative or absolute contraindications that preclude use of multiphasic CT (such as renal insufficiency, contrast allergy) and MRI (presence of metal in the body) where collecting system detail is deemed imperative, combining non-contrast CT or renal ultrasound (US) with retrograde pyelograms (RPGs) provides alternative evaluation of the entire upper tracts.
- The use of urine cytology and urine markers (NMP22, BTA-stat, and UroVysion FISH) is NOT recommended as a part of the routine evaluation of the asymptomatic microhematuria patient.
- In patients with persistent microhematuria following a negative work up or those with other risk factors for carcinoma in situ (e.g., irritative voiding symptoms, current or past tobacco use, chemical exposures), cytology may be useful.

- Blue light cystoscopy should not be used in the evaluation of patients with asymptomatic microhematuria.
- If a patient with a history of persistent asymptomatic microhematuria has two consecutive negative annual urinalyses (UA) [one per year for 2 years from the time of initial evaluation or beyond], then no further UA for the purpose of evaluation of AMH is necessary.
- For persistent asymptomatic microhematuria after negative urologic work up, yearly UA should be conducted.
- For persistent or recurrent asymptomatic microhematuria after initial negative urologic work-up, repeat evaluation at 3-5 years should be considered.

TABLE 1.

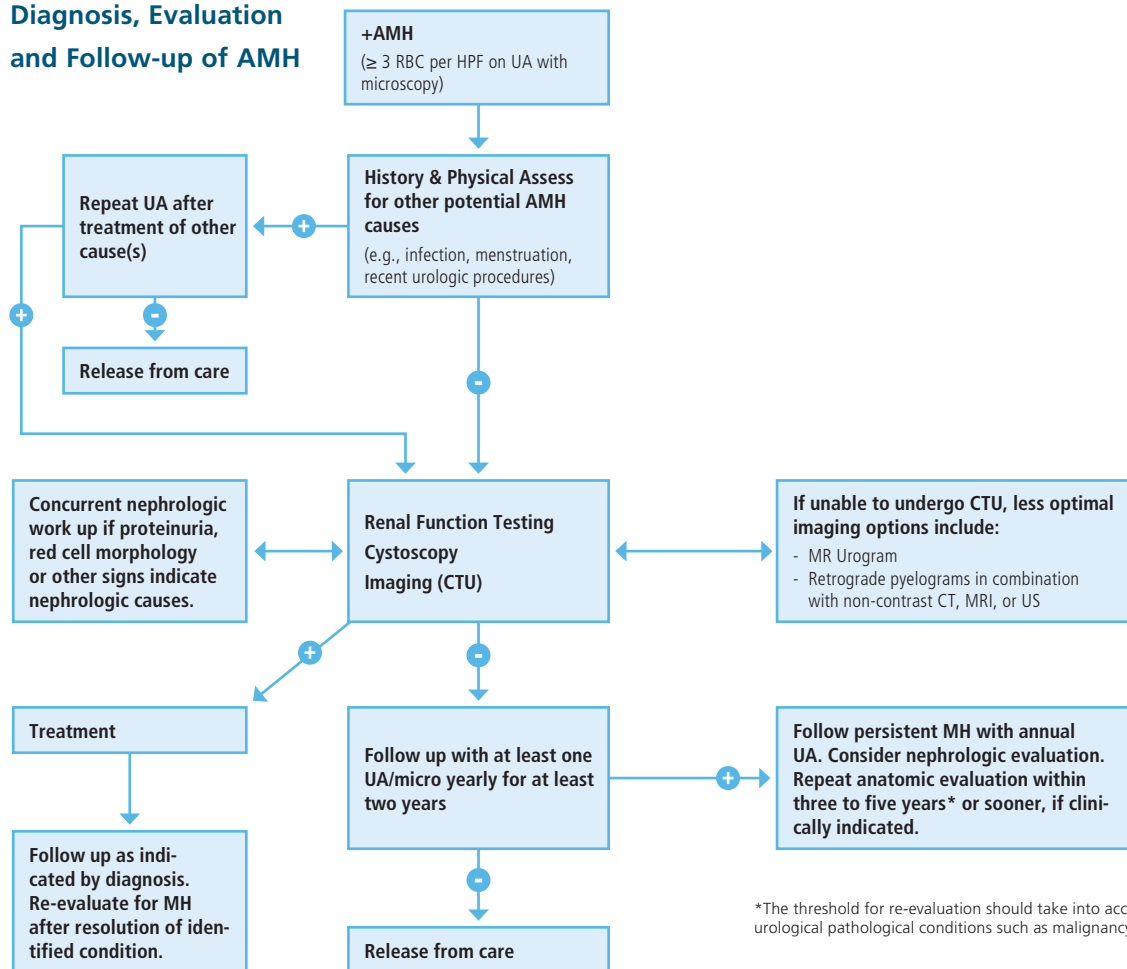
Common Risk Factors for Urinary Tract Malignancy in Patients with Microhematuria

Male gender
Age (> 35 years)
Past or current smoking
Occupational or other exposure to chemicals or dyes (benzenes or aromatic amines)
Analgesic abuse
History of gross hematuria
History of urologic disorder or disease
History of irritative voiding symptoms
History of pelvic irradiation
History of chronic urinary tract infection
History of exposure to known carcinogenic agents or chemotherapy such as alkylating agents
History of chronic indwelling foreign body

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FIGURE 1.

Diagnosis, Evaluation and Follow-up of AMH



*The threshold for re-evaluation should take into account patient risk factors for urological pathological conditions such as malignancy.

MANAGEMENT OF BENIGN PROSTATIC HYPERPLASIA

AUA Guideline (2010)

Benign prostatic hyperplasia (BPH) can be associated with bothersome lower urinary tract symptoms (LUTS) that affect quality of life by interfering with normal daily activities and sleep patterns. Since the impact of LUTS on a patient's quality of life is highly variable and is not directly related to any measurable physiologic factors, the patient's perception of the severity of the condition, and the degree to which it interferes with his lifestyle and causes embarrassment, should be primary considerations in management.

A framework for diagnosis and treatment of BPH/LUTS in an index patient of greater than 45 years of age without significant risk of non-BPH causes is presented (Figure 1). This Guideline addresses LUTS secondary to BPH (LUTS/BPH); that is, the patient does not have a history suggesting non-BPH causes of LUTS and the LUTS may or may not be associated with an enlarged prostate gland, bladder outlet obstruction (BOO), or histological BPH. Two treatment algorithms, one on the basic management of LUTS in men and one on the detailed management for persistent bothersome LUTS were adapted for this Guideline from the 2005 International Consultation of Urologic Diseases and reiterated in a 2009 in an article by Abrams et al (2009).

All statements contained within this Guideline are based on outcomes data and are tempered by the Panel's expert opinion. Guidelines statements are graded using three

evidence-based levels and two consensus-based levels with respect to the degree of flexibility in their application. Please refer to the full Guideline for the grades of individual statements.

Evaluation of Benign Prostatic Hyperplasia

The goal of evaluating patients presenting with LUTS is to establish that the symptoms are due to BPH, with treatment focusing not only on alleviating symptoms, but also on altering disease progression and preventing complications.

Initial Evaluation

- The initial evaluation should include:
 - ◆ a medical history to identify other causes of voiding dysfunction or comorbidities that may complicate treatment;
 - ◆ a physical examination, including both digital rectal and focused neurological examinations;
 - ◆ a urinalysis performed by dipstick testing or microscopic examination of the sediment to screen for hematuria, glucose and urinary tract infection (UTI);
 - ◆ and measurement of the serum prostate-specific antigen (PSA) offered to patients 1) with at least a 10-year life expectancy and for whom knowledge of the presence of prostate cancer would change management, or 2) for whom the PSA measurement may change the management of the patient's voiding symptoms.

Frequency volume charts should be used when nocturia is the dominant symptom, and also in other settings. Urine cytology is an optional test in men with a predominance of irritative symptoms, especially with a history of smoking or

other risk factors, to aid in the diagnosis of bladder carcinoma in situ and bladder cancer. The routine measurement of serum creatinine levels is not recommended.

Symptom Assessment

Symptom quantification is important to determine disease severity, document therapeutic response to therapy and detect symptom progression in men managed by watchful waiting.

- Administer the AUA Symptom Index (identical to the seven symptom questions of the International Prostate Symptom Score [IPSS]).
- Administer other validated assessment instruments, including the BPH Impact Index, if warranted.

Other Diagnostic Tests

- Additional diagnostic tests (pressure-flow urodynamics studies, urethrocytoscopy and ultrasound [transabdominal or transrectal]) are not recommended in the initial evaluation of LUTS but are optional in the following settings when choosing invasive therapies, particularly if the outcome of the pressure-flow study may impact choice of intervention, or if prostate size and anatomical configuration are important considerations for a given treatment modality.
- Urinary flow rate recording and measurement of post-void residual urine usually are not necessary prior to the institution of watchful waiting or medical therapy. However, they may be helpful in patients with a complex medical history, those with persistent or bothersome LUTS after basic management and in those desiring invasive therapy.

- Filling cystometography and upper urinary tract imaging by ultrasonography or excretory urography are not recommended in the typical patient unless the patient has hematuria, UTI, renal insufficiency or a history of urolithiasis or urinary tract surgery.

Initial Management and Preliminary Discussion of Treatment Options with the Patient

Patients with Mild Symptoms

- Watchful waiting is the treatment of choice in patients with mild symptoms of BPH (AUA Symptom Score <8) and patients with moderate or severe symptoms who are not bothered by their symptoms (i.e., do not interfere with the daily activities of living).
- A urologist should be consulted (if not done already) if a patient has persistent, bothersome LUTS after basic management.

Patients with Moderate to Severe Symptoms

- Treatment options for patients with bothersome moderate to severe symptoms of BPH (AUA Symptom Score >8) include watchful waiting and the medical, minimally invasive or surgical therapies defined in Table 1.
- Explain the benefits and harms of the BPH treatment options (including watchful waiting) using the information provided in the full text document (on www.AUAnet.org), to patients with moderate to severe symptoms (AUA Symptom Score >8) who are bothered enough to consider therapy.

Treatment Recommendations

Watchful Waiting

- Watchful waiting is indicated for patients with mild or non-bothersome symptoms whose overall health is not compromised by bladder outlet obstruction.

Medical Treatment

ALPHA-ADRENERGIC BLOCKERS

- Alfuzosin, doxazosin, tamsulosin and terazosin are appropriate treatment options for patients with LUTS secondary to BPH and are believed to have equal clinical effectiveness. These drugs should be the first treatment of choice when BOO symptoms predominate.
- The older, less costly generic alpha blockers remain reasonable choices. These require dose titration and blood pressure monitoring.
- Physicians and patients should be aware that a surgical condition termed Intraoperative Floppy Iris Syndrome (IFIS) has been observed during cataract surgery in some patients treated with alpha-1 blockers. Most reports were in patients taking the alpha-1 blocker when IFIS occurred, but in some cases, the alpha-1 blocker had been stopped prior to surgery. The benefit of stopping alpha-1 blocker therapy prior to cataract surgery has not been established. Men with planned cataract surgery should avoid the initiation of alpha blockers until their cataract surgery is completed.
- Prazosin or phenoxybenzamine should not be used in this setting.

5 Alpha-reductase Inhibitors

FINASTERIDE AND DUTASTERIDE ARE:

- Appropriate and effective treatments in patients with LUTS associated with demonstrable prostatic enlargement.
- Indicated for patients with symptomatic prostatic enlargement but no bother, to prevent disease progression. [Present the disadvantages of this approach (side effects and the need for long-term daily therapy) to the patient with an estimate of his baseline risk of progression to aid in informed decision making.]
- **Not** appropriate for men with LUTS without evidence of prostatic enlargement.
- **Finasteride is an appropriate and effective treatment alternative in men with refractory hematuria presumably due to prostatic bleeding (i.e., after exclusion of any other causes of hematuria). A similar level of evidence concerning dutasteride was not reviewed; it is the expert opinion of the Panel that dutasteride likely functions in a similar fashion.**
- **Overall, there is insufficient evidence to recommend using 5-ARIs preoperatively in the setting of a scheduled TURP to reduce intraoperative bleeding or reduce the need for blood transfusions.**

ANTICHOLINERGIC AGENTS

- Are appropriate and effective in men with predominately irritative symptoms and without an elevated post-void residual (PVR).

- Baseline PVR should be assessed prior to starting anticholinergic therapy. **Anticholinergics should be used with caution in patients with a post-void residual greater than 250 to 300 mL.**

COMBINATION THERAPY

- Concomitant use of an alpha-adrenergic receptor blocker and a 5 alpha-reductase inhibitor – or an alpha-adrenergic receptor blocker and an anticholinergic – is an appropriate and effective treatment for patients with LUTS associated with demonstrable prostatic enlargement.

COMPLEMENTARY AND ALTERNATIVE MEDICINES (CAM)

- No dietary supplement, combination phytotherapeutic agent or other nonconventional therapy is recommended for the management of LUTS secondary to BPH.
- Available data do not suggest that saw palmetto has a clinically meaningful effect on LUTS secondary to BPH. Further clinical trials are in progress and the results of these studies will elucidate the potential value of saw palmetto extracts in the management of patients with BPH.
- The paucity of published high quality, single extract clinical trials of *Urtica dioica* do not provide a sufficient evidence base with which to recommend for or against its use for the treatment of LUTS secondary to BPH.

Minimally-invasive Surgical Therapies

TRANSURETHRAL MICROWAVE HEAT TREATMENT (TUMT) AND TRANSURETHRAL NEEDLE ABLATION (TUNA)

- Safety recommendations for the use of TUMT and TUNA published by the United States Food and

Drug Administration (located here www.fda.gov/MedicalDevices/Safety/AlertsandNotices/default.htm) should be followed.

- Transurethral needle ablation is an effective treatment in partially relieving symptoms of BPH.
- TUMT is effective in partially relieving LUTS secondary to BPH and may be considered in men with moderate or severe symptoms.

SURGICAL PROCEDURES

- The patient may appropriately select a surgical intervention as his initial treatment if he has bothersome symptoms.
- Patients who have developed complications from BPH are best treated surgically.
- The choices of surgical approach (open or endoscopic) and energy source (electrocautery vs. laser, monopolar vs. bipolar approach) are technical decisions based on the patient's prostate size, the individual surgeon's judgment and the patient's comorbidities.
- The choice of approach should be based on the patient's individual presentation, including anatomy, the surgeon's experience and discussion of the potential benefit and risks for complications.

PROSTATECTOMY

- Open prostatectomy is an appropriate and effective treatment alternative for men with moderate to severe LUTS and/or who are significantly bothered by these symptoms.

- Men with moderate to severe LUTS and/or who are significantly bothered by these symptoms can consider a laparoscopic or robotic prostatectomy.

LASER THERAPIES

- Laser therapies are appropriate and effective treatment alternatives to transurethral resection of the prostate and open prostatectomy in men with moderate to severe LUTS and/or those who are significantly bothered by these symptoms.
- Laser therapies include: transurethral laser enucleation (holmium laser resection of the prostate [HoLRP], holmium laser enucleation of the prostate [HoLEP]), transurethral side firing laser ablation (holmium laser ablation of the prostate [HoLAP], and photoselective vaporization [PVP]). The choice of approach should be based on the patient's presentation, anatomy, the surgeon's level of training and experience and a discussion of the potential benefit and risks for complications.
- Generally, transurethral laser approaches have been associated with shorter catheterization time and length of stay, with comparable improvements in LUTS. There is a decreased risk of the perioperative complication of transurethral resection syndrome. Information concerning certain outcomes, including retreatment and urethral strictures, is limited due to short follow-up.
- As with all new devices, comparison of outcomes between studies should be considered cautiously given the rapid evolution in technologies and power levels.

- Emerging evidence suggests a possible role of transurethral enucleation and laser vaporization as options for men with very large prostates (> 100 g). There are insufficient data on which to base comments on bleeding.

Other Treatments

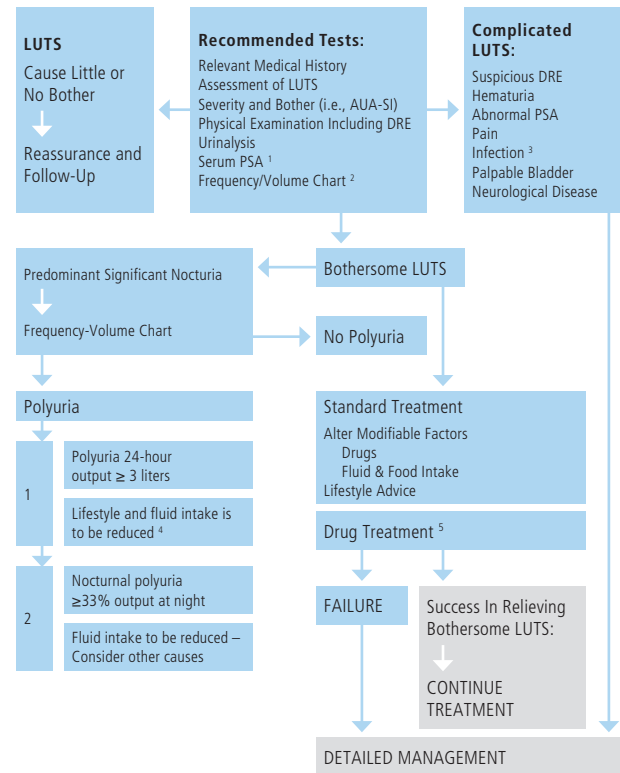
- Transurethral Incision of the Prostate (TUIP)
 - When prostate is less than 30mL in size
- Transurethral Electro vaporization of the Prostate (TUEVP)
- Transurethral Resection of the Prostate (TURP)

Therapies for Patients with Uncommon or Serious Complications of BPH

- Surgery is recommended for patients with the following complications:
 - Refractory retention who have failed at least one attempt at catheter removal. In patients who are not surgical candidates, treatment with intermittent catheterization, an indwelling catheter or stent is recommended.
 - Renal insufficiency clearly due to BPH.
 - Recurrent UTIs, recurrent gross hematuria or bladder stones clearly due to BPH and refractory to other therapies.
 - A bladder diverticulum is not an absolute indication for surgery, unless it is associated with recurrent UTI or progressive bladder dysfunction.
 - Concomitant administration of an alpha blocker is an option prior to attempted catheter removal in patients with urinary retention.

FIGURE 1.

Basic Management of LUTS in Men

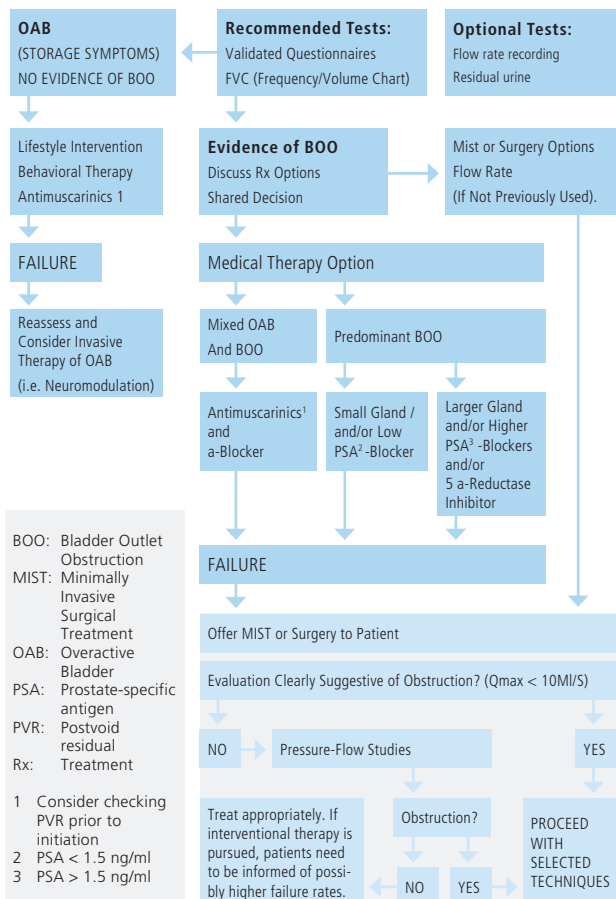


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- When life expectancy is > 10 years and if the diagnosis of prostate cancer can modify the management. For the AUA PSA Best Practice Statement: 2009 Update, see: www.auanet.org.
- When significant nocturia is a predominant symptom.
- Assess and start treatment before referral.
- In practice, advise patients with symptoms to aim for a urine output of about 1 liter/24 hours
- See Figure 2

FIGURE 2.

Detailed Management for Persistent Botherome LUTS after Basic Management



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TABLE 1.1

Criteria for antimicrobial prophylaxis for patients with orthopedic conditions

Watchful Waiting	
Medical Therapies	<ul style="list-style-type: none"> Alpha-Blockers <ul style="list-style-type: none"> Alfuzosin Doxazosin Tamsulosin Terazosin Silodosin* 5- Alpha-reductase inhibitors (5-ARIs) <ul style="list-style-type: none"> Dutasteride Finasteride Combination Therapy <ul style="list-style-type: none"> Alpha blocker and 5-alpha-reductase inhibitor Alpha blocker and anticholinergics Anticholinergic Agents
Complementary and Alternative Medicines (CAM)	
Minimally-invasive Therapies	<ul style="list-style-type: none"> Transurethral needle ablation (TUNA) Transurethral microwave thermotherapy (TUMT)
Surgical Therapies	<ul style="list-style-type: none"> Open prostatectomy Transurethral holmium laser ablation of the prostate (HoLAP) Transurethral holmium laser enucleation of the prostate (HoLEP) Holmium laser resection of the prostate (HoLRP) Photoselective vaporization of the prostate (PVP) Transurethral incision of the prostate (TUIP) Transurethral vaporization of the prostate (TUVP) Transurethral resection of the prostate (TURP)

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*Silodosin was approved by the US Food and Drug Administration but there were no published articles in the peer reviewed literature prior to the cut-off date for the literature search.

DIAGNOSIS AND TREATMENT OF NON-MUSCLE INVASIVE BLADDER CANCER

AUA/SUO GUIDELINE (2016)

The survival rate for the majority of patients with non-muscle invasive bladder cancer (NMIBC) is favorable; however, the rates of recurrence and progression to muscle-invasive bladder cancer (MIBC) are important surrogate endpoints for overall prognosis, as these are major determinants of long-term outcome. The recurrence and progression probability rates depend on several clinical and pathologic factors. Therefore, the ability to predict risk of recurrence and progression and treat the disease appropriately is important. This guideline provides a risk-stratified clinical framework for the management of NMIBC.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used

when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

TABLE 1.

AUA Risk Stratification for Non-Muscle Invasive Bladder Cancer

Low Risk	Intermediate Risk	High Risk
LG ^a solitary Ta ≤ 3cm	Recurrence within 1 year, LG Ta	HG T1
PUNLMP ^b	Solitary LG Ta > 3cm	Any recurrent, HG Ta
	LG Ta, multifocal	HG Ta, >3cm (or multifocal)
	HG ^c Ta, ≤ 3cm	Any CIS ^d
	LG T1	Any BCG failure in HG patient
		Any variant histology
		Any LVI ^e
		Any HG prostatic urethral involvement

^aLG = low grade; ^bPUNLMP = papillary urothelial neoplasm of low malignant potential; ^cHG = high grade; ^dCIS=carcinoma in situ; ^eLVI = lymphovascular invasion

Guideline Statements

Diagnosis

- At the time of resection of suspected bladder cancer, a clinician should perform a thorough cystoscopic examination of a patient's entire urethra and bladder that evaluates and documents tumor size, location, configuration, number, and mucosal abnormalities. *(Clinical Principle)*
- At initial diagnosis of a patient with bladder cancer, a clinician should perform complete visual resection of the bladder tumor(s), when technically feasible. *(Clinical Principle)*
- A clinician should perform upper urinary tract imaging as a component of the initial evaluation of a patient with bladder cancer. *(Clinical Principle)*
- In a patient with a history of NMIBC with normal cystoscopy and positive cytology, a clinician should consider prostatic urethral biopsies and upper tract imaging, as well as enhanced cystoscopic techniques (blue light cystoscopy, when available), ureteroscopy, or random bladder biopsies. *(Expert Opinion)*

Risk Stratification

- At the time of each occurrence/recurrence, a clinician should assign a clinical stage and classify a patient accordingly as "low-," "intermediate-," or "high-risk." *(Moderate Recommendation; Evidence Level: Grade C)*

Variant Histologies

- An experienced genitourinary pathologist should

review the pathology of a patient with any doubt in regards to variant or suspected variant histology (e.g., micropapillary, nested, plasmacytoid, neuroendocrine, sarcomatoid), extensive squamous or glandular differentiation, or the presence/absence of LVI.

(Moderate Recommendation; Evidence Level: Grade C)

- If a bladder sparing approach is being considered in a patient with variant histology, then a clinician should perform a restaging transurethral resection of bladder tumor (TURBT) within four to six weeks of the initial TURBT. *(Expert Opinion)*
- Due to the high rate of upstaging associated with variant histology, a clinician should consider offering initial radical cystectomy. *(Expert Opinion)*

Urine Markers after Diagnosis of Bladder Cancer

- In surveillance of NMIBC, a clinician should not use urinary biomarkers in place of cystoscopic evaluation. *(Strong Recommendation; Evidence Level: Grade B)*
- In a patient with a history of low-risk cancer and a normal cystoscopy, a clinician should not routinely use a urinary biomarker or cytology during surveillance. *(Expert Opinion)*
- In a patient with NMIBC, a clinician may use biomarkers to assess response to intravesical BCG (UroVysion® FISH) and adjudicate equivocal cytology (UroVysion® FISH and ImmunoCyt™). *(Expert Opinion)*

TURBT/Repeat Resection: Timing, Technique, Goal, Indication

- In a patient with non-muscle invasive disease who underwent an incomplete initial resection (not all visible tumor treated), a clinician should perform repeat transurethral resection or endoscopic treatment of all remaining tumor if technically feasible. *(Strong Recommendation; Evidence Level: Grade B)*
- In a patient with high-risk, high-grade Ta tumors, a clinician should consider performing repeat transurethral resection of the primary tumor site within six weeks of the initial TURBT. *(Moderate Recommendation; Evidence Level: Grade C)*
- In a patient with T1 disease, a clinician should perform repeat transurethral resection of the primary tumor site to include muscularis propria within six weeks of the initial TURBT. *(Strong Recommendation; Evidence Level: Grade B)*

Intravesical Therapy; BCG/Maintenance; Chemotherapy/ BCG Combinations

- In a patient with suspected or known low- or intermediate-risk bladder cancer, a clinician should consider administration of a single postoperative instillation of intravesical chemotherapy (e.g., mitomycin C or epirubicin) within 24 hours of TURBT. In a patient with a suspected perforation or extensive resection, a clinician should not use postoperative chemotherapy. *(Moderate Recommendation; Evidence Level: Grade B)*
- In a low-risk patient, a clinician should not administer induction intravesical therapy. *(Moderate*

Recommendation; Evidence Level: Grade C)

- In an intermediate-risk patient a clinician should consider administration of a six week course of induction intravesical chemotherapy or immunotherapy. (*Moderate Recommendation; Evidence Level: Grade B)*
- In a high-risk patient with newly diagnosed CIS, high-grade T1, or high-risk Ta urothelial carcinoma, a clinician should administer a six-week induction course of BCG. (*Strong Recommendation; Evidence Level: Grade B)*
- In an intermediate-risk patient who completely responds to an induction course of intravesical chemotherapy, a clinician may utilize maintenance therapy. (*Conditional Recommendation; Evidence Level: Grade C)*
- In an intermediate-risk patient who completely responds to induction BCG, a clinician should consider maintenance BCG for one year, as tolerated. (*Moderate Recommendation; Evidence Level: Grade C)*
- In a high-risk patient who completely responds to induction BCG, a clinician should continue maintenance BCG for three years, as tolerated. (*Moderate Recommendation; Evidence Level: Grade B)*

BCG Relapse and Salvage Regimens

- In an intermediate- or high-risk patient with persistent or recurrent disease or positive cytology following intravesical therapy, a clinician should consider performing prostatic urethral biopsy and an upper tract evaluation prior to administration of additional intravesical therapy. (*Conditional Recommendation; Evidence Level: Grade C)*
- In an intermediate- or high-risk patient with persistent

or recurrent Ta or CIS disease after a single course of induction intravesical BCG, a clinician should offer a second course of BCG. (*Moderate Recommendation; Evidence Level: Grade C)*

- In a patient fit for surgery with high-grade T1 disease after a single course of induction intravesical BCG, a clinician should offer radical cystectomy. (*Moderate Recommendation; Evidence Level: Grade C)*
- A clinician should not prescribe additional BCG to a patient who is intolerant of BCG or has documented recurrence on TURBT of high-grade, non-muscle-invasive disease and/or CIS within six months of two induction courses of BCG or induction BCG plus maintenance. (*Moderate Recommendation; Evidence Level: Grade C)*
- In a patient with persistent or recurrent intermediate- or high-risk NMIBC who is unwilling or unfit for cystectomy following two courses of BCG, a clinician may recommend clinical trial enrollment. A clinician may offer this patient intravesical chemotherapy when clinical trials are unavailable. (*Expert Opinion)*

Role of Cystectomy in NMIBC

- In a patient with Ta low- or intermediate-risk disease, a clinician should not perform radical cystectomy until bladder-sparing modalities (staged TURBT, intravesical therapies) have failed. (*Clinical Principle)*
- In a high-risk patient who is fit for surgery with persistent high-grade T1 disease on repeat resection, or T1 tumors with associated CIS, LVI, or variant histologies, a clinician should consider offering initial radical cystectomy. (*Moderate Recommendation; Evidence Level: Grade C)*

- In a high-risk patient with persistent or recurrent disease within one year following treatment with two induction cycles of BCG or BCG maintenance, a clinician should offer radical cystectomy. (*Moderate Recommendation; Evidence Level: Grade C*)

Enhanced Cystoscopy

- In a patient with NMIBC, a clinician should offer blue light cystoscopy at the time of TURBT, if available, to increase detection and decrease recurrence. (*Moderate Recommendation; Evidence Level: Grade B*)
- In a patient with NMIBC, a clinician may consider use of narrow band imaging to increase detection and decrease recurrence. (*Conditional Recommendation; Evidence Level: Grade C*)

Risk Adjusted Surveillance and Follow-up Strategies

- After completion of the initial evaluation and treatment of a patient with NMIBC, a clinician should perform the first surveillance cystoscopy within three to four months. (*Expert Opinion*)
- For a low-risk patient whose first surveillance cystoscopy is negative for tumor, a clinician should perform subsequent surveillance cystoscopy six to nine months later, and then annually thereafter; surveillance after five years in the absence of recurrence should be based on shared-decision making between the patient and clinician. (*Moderate Recommendation; Evidence Level: Grade C*)
- In an asymptomatic patient with a history of low-risk NMIBC, a clinician should not perform routine

surveillance upper tract imaging. (*Expert Opinion*)

- In a patient with a history of low-grade Ta disease and a noted sub-centimeter papillary tumor(s), a clinician may consider in-office fulguration as an alternative to resection under anesthesia. (*Expert Opinion*)
- For an intermediate-risk patient whose first surveillance cystoscopy is negative for tumor, a clinician should perform subsequent cystoscopy with cytology every 3-6 months for 2 years, then 6-12 months for years 3 and 4, and then annually thereafter. (*Expert Opinion*)
- For a high-risk patient whose first surveillance cystoscopy is negative for tumor, a clinician should perform subsequent cystoscopy with cytology every three to four months for two years, then six months for years three and four, and then annually thereafter. (*Expert Opinion*)
- For an intermediate- or high-risk patient, a clinician should consider performing surveillance upper tract imaging at one to two year intervals. (*Expert Opinion*)

TREATMENT OF NON-METASTATIC MUSCLE- INVASIVE BLADDER CANCER:

AUA/ASCO/ASTRO/SUO GUIDELINE (2017)

Purpose

Although representing approximately 25% of patients diagnosed with bladder cancer, muscle-invasive bladder cancer (MIBC) carries a significant risk of death that has not significantly changed in decades. Increasingly, clinicians and patients recognize the importance of multidisciplinary collaborative efforts that take into account survival and quality of life concerns. For the first time for any type of malignancy, the American Urological Association (AUA), the American Society of Clinical Oncology (ASCO), the American Society for Radiation Oncology (ASTRO), and the Society of Urologic Oncology (SUO) have formulated an evidence-based guideline. This guideline provides a risk-stratified clinical framework for the management of clinically non-metastatic, muscle-invasive urothelial bladder cancer (cT2-T4N0M0) and focuses on evaluation, treatment, and surveillance guided toward curative intent. This document is designed for use in conjunction with the associated treatment algorithm.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations**

are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Guideline Statements

Initial Patient Evaluation and Counseling

- Prior to treatment consideration, a full history and physical exam should be performed, including an exam under anesthesia, at the time of transurethral resection of bladder tumor (TURBT) for a suspected invasive cancer. (*Clinical Principle*)
- Prior to MIBC management, clinicians should perform a complete staging evaluation, including imaging of the chest and cross sectional imaging of the abdomen and pelvis with intravenous contrast if not contraindicated. Laboratory evaluation should include a comprehensive metabolic panel (complete blood count, liver function tests, alkaline phosphatase, and renal function). (*Clinical Principle*)
- An experienced genitourinary pathologist should review

the pathology of a patient when variant histology is suspected or if muscle invasion is equivocal (e.g., micropapillary, nested, plasmacytoid, neuroendocrine, sarcomatoid, extensive squamous or glandular differentiation). (*Clinical Principle*)

- For patients with newly diagnosed MIBC, curative treatment options should be discussed before determining a plan of therapy that is based on both patient comorbidity and tumor characteristics. Patient evaluation should be completed using a multidisciplinary approach. (*Clinical Principle*)
- Prior to treatment, clinicians should counsel patients regarding complications and the implications of treatment on quality of life (e.g., impact on continence, sexual function, fertility, bowel dysfunction, metabolic problems). (*Clinical Principle*)

TREATMENT

Neoadjuvant/Adjuvant Chemotherapy

- Utilizing a multidisciplinary approach, clinicians should offer cisplatin-based neoadjuvant chemotherapy to eligible radical cystectomy patients prior to cystectomy. (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should not prescribe carboplatin-based neoadjuvant chemotherapy for clinically resectable stage cT2-T4aN0 bladder cancer. Patients ineligible for cisplatin-based neoadjuvant chemotherapy should proceed to definitive locoregional therapy. (*Expert Opinion*)
- Clinicians should perform radical cystectomy as soon as

possible following a patient's completion of and recovery from neoadjuvant chemotherapy. (*Expert Opinion*)

- Eligible patients who have not received cisplatin-based neoadjuvant chemotherapy and have non-organ confined (pT3/T4 and/or N+) disease at cystectomy should be offered adjuvant cisplatin-based chemotherapy. (*Moderate Recommendation; Evidence Level: Grade C*)

Radical Cystectomy

- Clinicians should offer radical cystectomy with bilateral pelvic lymphadenectomy for surgically eligible patients with resectable non-metastatic (M0) MIBC. (*Strong Recommendation; Evidence Level: Grade B*)
- When performing a standard radical cystectomy, clinicians should remove the bladder, prostate, and seminal vesicles in males and should remove the bladder, uterus, fallopian tubes, ovaries, and anterior vaginal wall in females. (*Clinical Principle*)
- Clinicians should discuss and consider sexual function preserving procedures for patients with organ-confined disease and absence of bladder neck, urethra, and prostate (male) involvement. (*Moderate Recommendation; Evidence Level: Grade C*)

Urinary Diversion

- In patients undergoing radical cystectomy, ileal conduit, continent cutaneous, and orthotopic neobladder urinary diversions should all be discussed. (*Clinical Principle*)
- In patients receiving an orthotopic urinary diversion, clinicians must verify a negative urethral margin. (*Clinical Principle*)

Perioperative Surgical Management

- Clinicians should attempt to optimize patient performance status in the perioperative setting. (*Expert Opinion*)
- Perioperative pharmacologic thromboembolic prophylaxis should be given to patients undergoing radical cystectomy. (*Strong Recommendation; Evidence Level: Grade B*)
- In patients undergoing radical cystectomy, μ -opioid antagonist therapy should be used to accelerate gastrointestinal recovery, unless contraindicated. (*Strong Recommendation; Evidence Level: Grade B*)
- Patients should receive detailed teaching regarding care of urinary diversion prior to discharge from the hospital. (*Clinical Principle*)

Pelvic Lymphadenectomy

- Clinicians must perform a bilateral pelvic lymphadenectomy at the time of any surgery with curative intent. (*Strong Recommendation; Evidence Level: Grade B*)
- When performing bilateral pelvic lymphadenectomy, clinicians should remove, at a minimum, the external and internal iliac and obturator lymph nodes (standard lymphadenectomy). (*Clinical Principle*)

BLADDER PRESERVING APPROACHES

Patient Selection

- For patients with newly diagnosed non-metastatic MIBC who desire to retain their bladder, and for those with significant comorbidities for whom radical cystectomy is not a treatment option, clinicians should offer bladder

preserving therapy when clinically appropriate. (*Clinical Principle*)

- In patients under consideration for bladder preserving therapy, maximal debulking TURBT and assessment of multifocal disease/carcinoma in situ should be performed. (*Strong Recommendation; Evidence Level: Grade C*)

Maximal TURBT and Partial Cystectomy

- Patients with MIBC who are medically fit and consent to radical cystectomy should not undergo partial cystectomy or maximal TURBT as primary curative therapy. (*Moderate Recommendation; Evidence Level: Grade C*)

Primary Radiation Therapy

- For patients with MIBC, clinicians should not offer radiation therapy alone as a curative treatment. (*Strong Recommendation; Evidence Level: Grade C*)

Multi-Modal Bladder Preserving Therapy

- For patients with MIBC who have elected multi-modal bladder preserving therapy, clinicians should offer maximal TURBT, chemotherapy combined with external beam radiation therapy, and planned cystoscopic re-evaluation. (*Strong Recommendation; Evidence Level: Grade B*)
- Radiation sensitizing chemotherapy regimens should include cisplatin or 5- fluorouracil and mitomycin C. (*Strong Recommendation; Evidence Level: Grade B*)
- Following completion of bladder preserving therapy, clinicians should perform regular surveillance with CT scans, cystoscopy, and urine cytology. (*Strong Recommendation; Evidence Level: Grade C*)

Bladder Preserving Treatment Failure

- In patients who are medically fit and have residual or recurrent muscle-invasive disease following bladder preserving therapy, clinicians should offer radical cystectomy with bilateral pelvic lymphadenectomy. (*Strong Recommendation; Evidence Level: Grade C*)
- In patients who have a non-muscle invasive recurrence after bladder preserving therapy, clinicians may offer either local measures, such as TURBT with intravesical therapy, or radical cystectomy with bilateral pelvic lymphadenectomy. (*Moderate Recommendation; Evidence Level: Grade C*)

PATIENT SURVEILLANCE AND FOLLOW UP

Imaging

- Clinicians should obtain chest imaging and cross sectional imaging of the abdomen and pelvis with CT or MRI at 6-12 month intervals for 2-3 years and then may continue annually. (*Expert Opinion*)

Laboratory Values and Urine Markers

- Following therapy for MIBC, patients should undergo laboratory assessment at three to six month intervals for two to three years and then annually thereafter. (*Expert Opinion*)
- Following radical cystectomy in patients with a retained urethra, clinicians should monitor the urethral remnant for recurrence. (*Expert Opinion*)

Patient Survivorship

- Clinicians should discuss with patients how they are coping with their bladder cancer diagnosis and

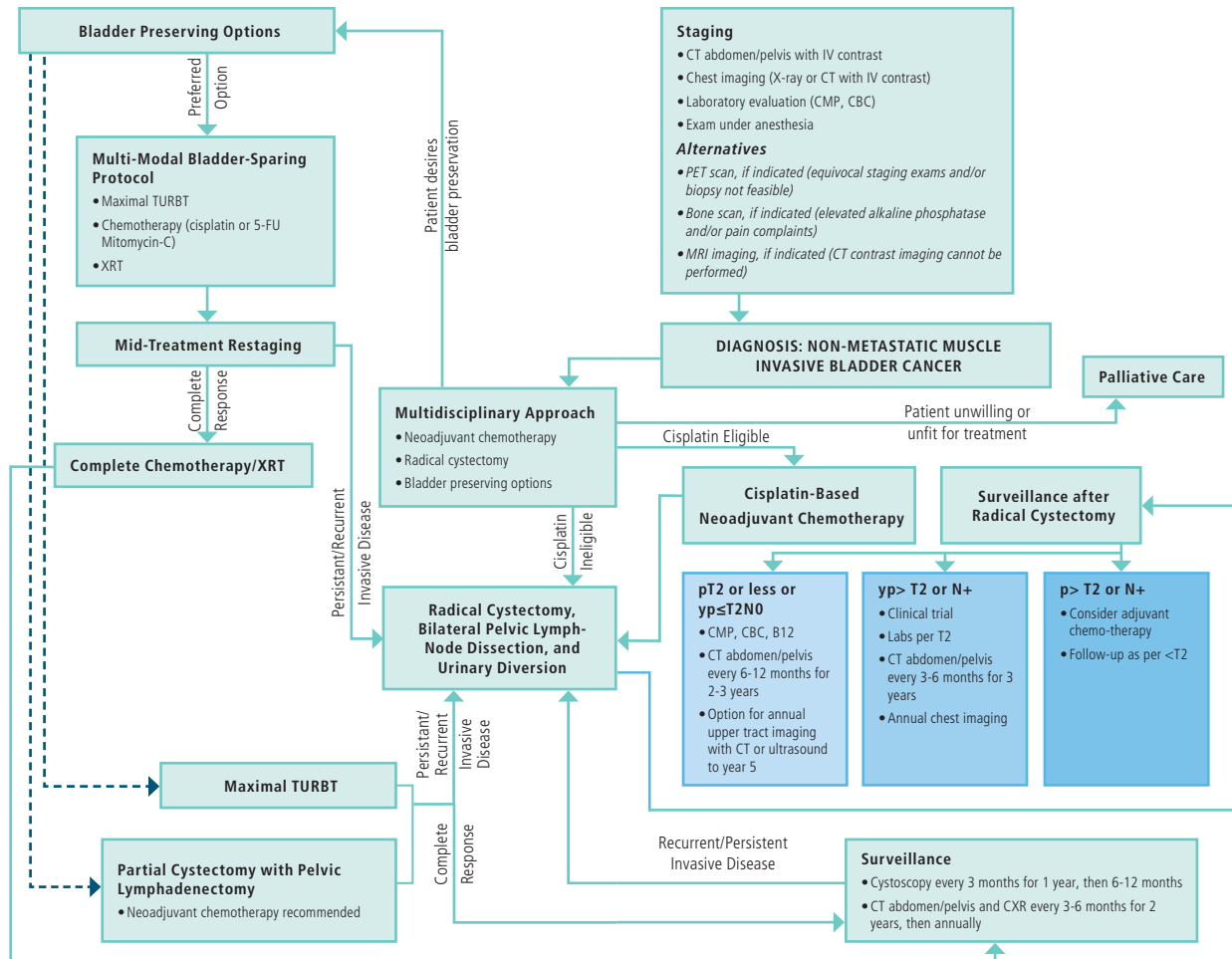
treatment and should recommend that patients consider participating in cancer support groups or consider receiving individual counseling. *(Expert Opinion)*

- Clinicians should encourage bladder cancer patients to adopt healthy lifestyle habits, including smoking cessation, exercise, and a healthy diet, to improve long-term health and quality of life. *(Expert Opinion)*

Variant Histology

- In patients diagnosed with variant histology, clinicians should consider unique clinical characteristics that may require divergence from standard evaluation and management for urothelial carcinoma. *(Expert Opinion)*

NON-METASTATIC MUSCLE-INVASIVE BLADDER CANCER: Treatment Algorithm



CBC= complete blood count; CMP= comprehensive metabolic panel; CXR= chest X-ray; p= pathologic stage; TURBT=trans-urethral resection of bladder tumor;

XRT= external beam radiation therapy; yp= pathologic stage after neoadjuvant chemotherapy

EVALUATION AND TREATMENT OF CRYPTORCHIDISM

(2014)

Purpose

Cryptorchidism, or undescended testis (UDT), is one of the most common pediatric disorders of the male endocrine glands and the most common genital disorder identified at birth. The main reasons for treatment of cryptorchidism include increased risks of impairment of fertility potential, testicular malignancy, torsion and/or associated inguinal hernia. Cryptorchidism has evolved significantly over the past half century, with respect to both diagnosis and treatment. The current standard of therapy in the United States is orchidopexy (also referred to as orchiopexy in the literature), or surgical repositioning of the testis within the scrotal sac, while hormonal therapy has fewer advocates. Successful scrotal relocation of the testis, however, may reduce but does not prevent these potential long-term sequelae in susceptible individuals. The purpose of this guideline is to provide physicians and non-physician providers (primary care and specialists) with a consensus of principles and treatment plans for the management of cryptorchidism. The panel members are representative of various medical specialties (pediatric urology, pediatric endocrinology, general pediatrics).

Diagnosis

- Providers should obtain gestational history at initial evaluation of boys with suspected cryptorchidism.
- Primary care providers should palpate testes for quality

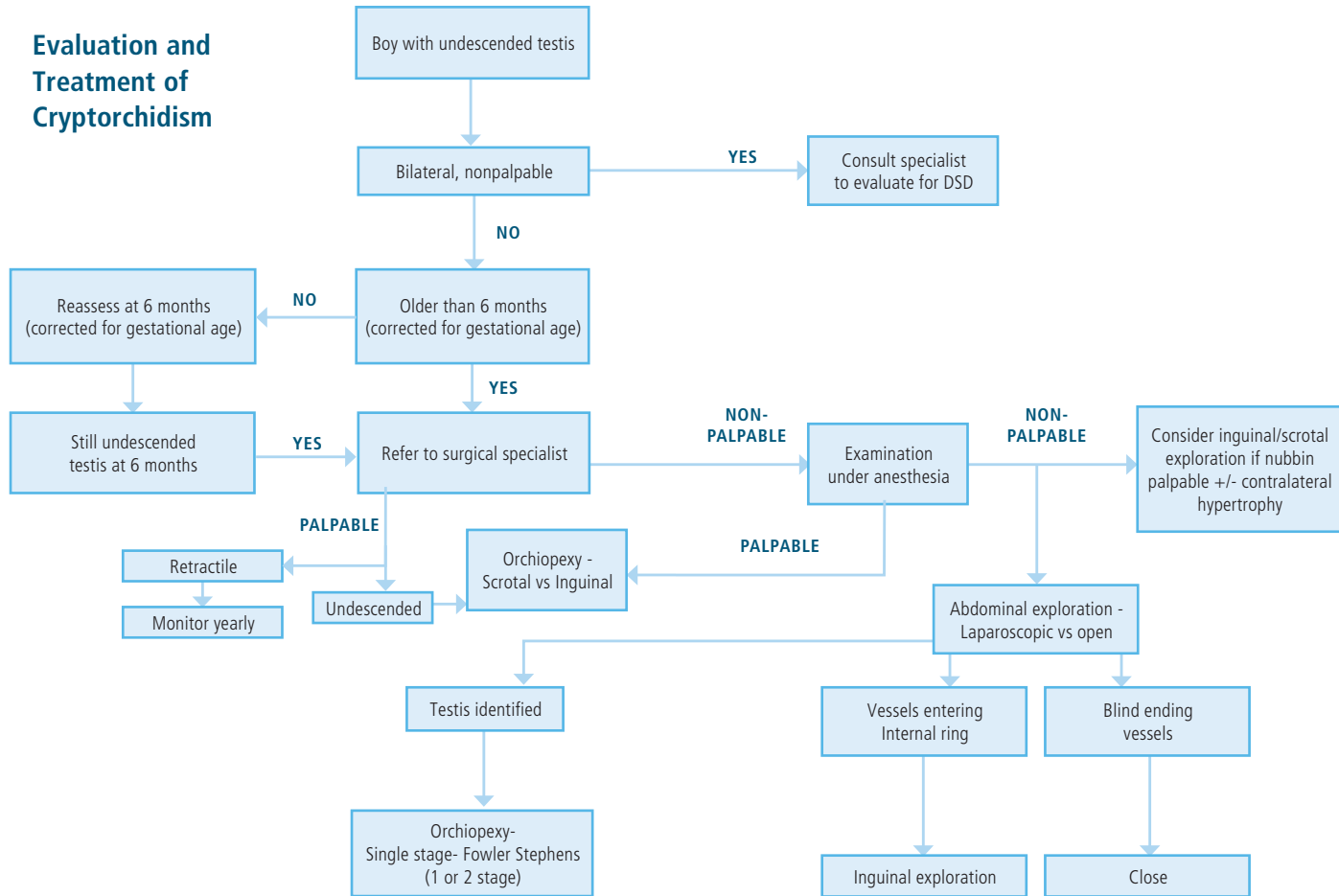
and position at each recommended well-child visit.

- Providers should refer infants with a history of cryptorchidism (detected at birth) who do not have spontaneous testicular descent by six months (corrected for gestational age) to an appropriate surgical specialist for timely evaluation.
- Providers should refer boys with the possibility of newly diagnosed (acquired) cryptorchidism after six months (corrected for gestational age) to an appropriate surgical specialist.
- Providers must immediately consult an appropriate specialist for all phenotypic male newborns with bilateral, non-palpable testes for evaluation of a possible disorder of sex development (DSD).
- Providers should not perform ultrasound (US) or other imaging modalities in the evaluation of boys with cryptorchidism prior to referral as these studies rarely assist in decision making.
- Providers should assess the possibility of a disorder of sex development (DSD) when there is increasing severity of hypospadias with cryptorchidism.
- In boys with bilateral, non-palpable testes who do not have congenital adrenal hyperplasia (CAH), providers should measure Müllerian Inhibiting Substance (MIS or Anti- Müllerian Hormone [AMH]) and consider additional hormone testing to evaluate for anorchia.
- In boys with retractile testes, providers should monitor the position of the testes at least annually to monitor for secondary ascent.

Treatment

- Providers should not use hormonal therapy to induce testicular descent as evidence shows low response rates and lack of evidence for long-term efficacy.
- In the absence of spontaneous testicular descent by six months (corrected for gestational age), specialists should perform surgery within the next year.
- In pre-pubertal boys with palpable, cryptorchid testes, surgical specialists should perform scrotal or inguinal orchiopexy.
- In pre-pubertal boys with non-palpable testes, surgical specialists should perform exam under anesthesia to reassess for palpability of testes. If non-palpable, surgical exploration and, if indicated, abdominal orchiopexy should be performed.
- At the time of exploration for a non-palpable testis in boys, surgical specialists should identify the status of the testicular vessels to help determine the next course of action.
- In boys with a normal contralateral testis, surgical specialists may perform an orchiectomy (removal of the undescended testis) if a boy has a normal contralateral testis and either very short testicular vessels and vas deferens, dysmorphic or a hypoplastic testis, or post-pubertal age.
- Providers should counsel boys with a history of cryptorchidism and/or monorchidism and their parents regarding potential long-term risks and provide education on infertility and cancer risk.

Evaluation and Treatment of Cryptorchidism



PREVENTION OF DEEP VEIN THROMBOSIS IN PATIENTS UNDERGOING UROLOGIC SURGERY

Best Practice Statement (2008)

Deep-vein thrombosis (DVT) is a common complication of surgical procedures; pulmonary thromboembolism (PTE) is one of the most common causes of nonsurgical death in patients undergoing urologic surgery. Long-term complications, such as post-thrombotic syndromes, can occur with significant morbidity and economic impact. In many patients undergoing low-risk procedures, early ambulation may be the only DVT prophylactic measure that is indicated. However, in patients with a high-risk profile undergoing a high-risk procedure, an assessment of all risk factors inherent to the patient and planned procedure should dictate the appropriate DVT prophylaxis.

- Therapeutic options for thromboprophylaxis include mechanical (nonpharmacologic) therapies (early ambulation, graduated compression stockings [GCS], and intermittent pneumatic compression [IPC]) and pharmacologic agents (low-dose unfractionated heparin [LDUH] and low molecular weight heparin [LMWH]).
- The combination of both mechanical and pharmacologic prevention strategies has been demonstrated in nonurologic procedures to be superior to either modality alone.

- ◆ Aspirin and other antiplatelet drugs are not recommended for venous thromboembolism (VTE) prophylaxis in surgical patients.
- ◆ When considering the pharmacologic options, the risk of bleeding complications should be considered. Postmarketing reports of epidural or spinal hematomas with the use of LMWH and concurrent spinal/epidural anesthesia or puncture prompted the United States Food and Drug Administration to issue a black box warning about this complication; although less frequently, this complication also has been reported with LDUH.

Assessing Patient Risk

When assessing the risk of DVT for an individual patient, both the procedure, with its inherent risk, and the patient's specific, predisposing factors must be considered. The appropriate DVT prophylaxis for a low-risk procedure may be more complex in a patient with a high-risk profile.

For patients undergoing transurethral surgery

- Early ambulation is recommended for DVT prophylaxis for the vast majority of transurethral procedures.
- For patients at increased risk of DVT undergoing transurethral resection of the prostate (TURP), the use of GCS, IPC, postoperative LDUH or LMWH may be indicated.

For patients undergoing anti-incontinence and pelvic reconstructive surgery

- The prevention of DVT in patients undergoing anti-incontinence and pelvic reconstructive surgeries should be dictated by preoperative individual patient risk factors

and procedure-specific risk factors for DVT formation.

- For low-risk patients undergoing minor procedures, the use of early postoperative ambulation appears to be sufficient.
- For moderate-risk patients undergoing higher risk procedures, the use of IPC, LDUH or LMWH should be utilized.
- For high-risk and highest-risk patients undergoing higher-risk procedures, combination therapy with IPC plus LDUH or LMWH should be utilized unless bleeding risk is considered unacceptably high.
- For patients undergoing urologic laparoscopic and/or robotically assisted urologic laparoscopic procedures.
- IPC devices at the time of the laparoscopic procedure are recommended.
- Some high-risk groups may require the use of LDUH and LMWH.

For patients undergoing open urologic surgery

- IPC is recommended.
- Given the presence of high-risk and very high-risk patients, common within this patient population, more aggressive regimens combining the use of IPC with pharmacologic prophylaxis should be considered.

FDA warnings

February 28, 2008 – Heparin Sodium Injection: The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled

all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin products sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.

December 3, 2008 – Innohep (tinzaparin): The U.S. Food and Drug Administration (FDA) has requested that the labeling for Innohep be revised to better describe overall study results which suggest that, when compared to unfractionated heparin, Innohep increases the risk of death for elderly patients (i.e., 70 years of age and older) with renal insufficiency. Healthcare professionals should consider the use of alternative treatments to Innohep when treating elderly patients over 70 years of age with renal insufficiency and deep vein thrombosis (DVT), pulmonary embolism (PE), or both.

TABLE 1.

Risk Factors for Increased Development of Deep Vein Thrombosis

Surgery	Obesity
Heart or respiratory failure	Increasing age
Trauma (major or lower extremity)	Smoking
Inflammatory bowel disease	Pregnancy and the postpartum period
Immobility, paresis	Varicose veins
Nephrotic syndrome	Estrogen-containing oral contraception or hormone replacement therapy
Malignancy	Central venous catheterization
Myeloproliferative disorders	Selective estrogen receptor modulators
Cancer therapy (hormonal, chemotherapy, or radiotherapy)	Inherited or acquired thrombophilia
Paroxysmal nocturnal hemoglobinuria	Acute medical illness
Previous Venous Thromboembolism	

Adapted with permission from Geerts et al. Chest 2004.⁸

TABLE 2.

Patient Risk Stratification⁸

Low risk	Minor* surgery in patients <40 years with no additional risk factors
Moderate risk	Minor* surgery in patients with additional risk factors Surgery in patients aged 40-60 years with no additional risk factors
High-risk	Surgery in patients >60 years Surgery in patients aged 40-60 years with additional risk factors (prior venous thromboembolism, cancer, hypercoagulable state, see table I)
Highest-risk	Surgery in patients with multiple risk factors (age >40 years, cancer, prior venous thromboembolism)

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* For the purposes of this paper, minor surgery is defined as a procedure with a relatively short operating time in which the patient is rapidly ambulatory. Adapted with permission from Geerts et al. Chest 2004.⁸

MANAGEMENT OF ERECTILE DYSFUNCTION

AUA Guideline (2005); Reviewed and Validity Confirmed (2011)

The recommendations contained herein are based on management of the index patient, defined as a man with no evidence of hypogonadism or hyperprolactinemia who develops, after a well-established period of normal erectile function, erectile dysfunction (ED) that is primarily organic in nature. Management of ED in patients with psychosexual etiology or endocrinopathies is not addressed.

Diagnostic Evaluation of Erectile Dysfunction

The goal of the diagnostic evaluation is to define the problem, to clearly distinguish ED from complaints about ejaculation and/or orgasm, and to establish the chronology and severity of symptoms.

The initial evaluation is conducted in person and should include thorough medical, sexual and psychosocial histories. An assessment of the patient's needs and his expectations of therapy are equally important.

- Perform a medical history to determine:
 - ✦ causes or comorbidities such as cardiovascular disease (e.g., hypertension, arteriosclerosis or hyperlipidemia), diabetes mellitus, depression and alcoholism
 - ✦ related dysfunctions
 - premature ejaculations
 - increased latency time associated with age

- psychosexual relationship problems
- ◆ contraindications for drug therapy
- ◆ additional risk factors (e.g., smoking, pelvic, perineal or penile trauma or surgery, neurologic disease, endocrinopathy, obesity, pelvic radiation therapy, Peyronie's disease, prescription or recreational drug use)
- ◆ other critical elements
 - alterations of sexual desire, ejaculation and orgasm
 - presence of genital pain
 - presence of genital deformity
 - lifestyle factors (e.g., sexual orientation, presence of spouse or partner and quality of the relationship with the partner)
 - history of partner's sexual function
- Perform a physical evaluation except in established patients with a new complaint of ED. Include:
 - ◆ a focused examination of the abdomen, penis, testicles, secondary sexual characteristics and lower extremity pulses
 - ◆ a digital rectal examination and a serum PSA measurement in men >50 years of age with an estimated life expectancy of more than 10 years and
 - ◆ additional assessments in select patients including
 - testosterone levels,
 - vascular and/or neurological,
 - nocturnal erections.

Initial Management and Discussion of Treatment Options with the Patient

Begin management by identifying organic comorbidities and

psychosexual dysfunctions, and appropriately treating them or triaging care. Consider non-surgical or surgical therapies (Table 1).

- Inform patient (and partner) of risks and benefits of available treatments.
- Consider comorbid conditions. Patients at intermediate and high risk for cardiovascular disease should be referred to a cardiologist.
- Choose treatment jointly with the patient and the partner, taking into consideration patient preferences and expectations.
- Initiate treatment in a step-wise fashion, with increasing invasiveness and risk balanced against the likelihood of efficacy.

Treatment Recommendations

Non-surgical Therapies

- Oral phosphodiesterase type 5 (PDE5) inhibitors (e.g., sildenafil, tadalafil, vardenafil) are first-line therapies unless contraindicated.
 - ◆ Monitor patients for efficacy, side effects and change in health status or medication.
 - ◆ If a patient fails to respond, determine adequacy of PDE5 inhibition before proceeding to other therapies. Recommend a different PDE5 inhibitor, or proceed with more invasive therapies.
 - ◆ Use caution if the patient is taking alpha blockers.
 - ◆ PDE5 inhibitors are contraindicated in patients taking organic nitrates or in whom sexual activity is unsafe.
- Alprostadil intra-urethral suppositories

- ◆ Consider using for a patient who has failed therapy with or is not a candidate for PDE5 inhibitors.
- ◆ Supervise initial dose due to risk of syncope.
- ◆ Can be used in combination with other treatment modalities, such as penile constriction devices or oral PDE5 inhibitors.
- Intracavernous vasoactive drug injection therapy
 - ◆ Supervise initial injection to determine dose, monitor for prolonged erection and instruct patient on proper technique.
 - ◆ Schedule periodic follow-ups to check for corporal fibrosis, review injection technique, and adjust therapy as necessary.
 - ◆ Choose either monotherapy with alprostadil and papaverine or combination therapy with other vasoactive drugs (e.g., bimix and trimix) which can increase efficacy or reduce side effects (Note: bimix and trimix are available only in pharmacies offering compounding services).
 - ◆ Inform the patient of potential for prolonged erection (lasting four hours), have a plan for the urgent treatment and inform the patient of the plan.
- Vacuum constriction devices
 - ◆ Recommend only those devices that contain a vacuum limiter.
- Other treatment modalities
 - ◆ Trazodone, yohimbine and herbal therapies are not recommended.
 - ◆ Testosterone is not indicated for treatment of ED in

patients with a normal serum testosterone level.

- ◆ Topical therapies do not appear to have significant efficacy beyond intra-urethral administration of alprostadil.

Surgical Therapies

- Penile prosthesis implantation
 - ◆ Inform the patient (and, when possible, his partner) of the:
 - types of prostheses available
 - possibility and consequences of infection and erosion, mechanical failure and resulting reoperation
 - differences from the normal flaccid and erect penis including penile shortening
 - possible reduction in effectiveness of other therapies if the device is subsequently removed
 - ◆ Do not perform prosthetic surgery in the presence of a systemic, cutaneous or urinary tract infection.
 - ◆ Administer preoperative antibiotics that provide Gram-negative and Gram-positive coverage.
 - ◆ Magnetic resonance imaging to evaluate status of a penile implant or for other indications is safe with all currently available prosthetics.
- Vascular surgery
 - ◆ Penile vascular surgeries intended to limit the venous outflow of the penis are not recommended.
 - ◆ Arterial reconstructive surgery is a treatment option only in healthy individuals 55 years old or younger who recently acquired ED secondary to focal arterial occlusive disease and do not have any evidence of generalized vascular disease.

TABLE 1.

Treatment Options for Patients with Erectile Dysfunction

Non-surgical Therapies
Oral drug therapy (alphabetical order) PDE5 inhibitors: Sildenafil Tadalafil Vardenafil
Intra-urethral drug therapy Alprostadil suppositories
Intracavernous vasoactive drug injection Alprostadil therapy Papaverine Papaverine-phenolamine Papaverine-alprostadil Papaverine-phenolamine-alprostadil
Vacuum constriction devices
Psychosexual therapy
Surgical Therapies
Penile prosthesis implantation Malleable (noninflatable) rods Inflatable prostheses
Vascular surgery

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FOLLOW-UP FOR CLINICALLY LOCALIZED RENAL NEOPLASMS

AUA Guideline (2013)

Purpose

The panel sought to create evidence-based guidelines for the follow-up and surveillance of clinically localized renal cancers treated with surgery or renal ablative procedures, biopsy-proven untreated clinically localized renal cancers followed on surveillance, and radiographically suspicious but biopsy-unproven renal neoplasms either treated with renal ablative procedures or followed on active surveillance. The panel focused on the early detection of cancer recurrence based on the traditional presumption that treatment of a lower tumor burden would result in better patient outcomes, although the evidentiary data supporting this presumption is limited. These guidelines are not meant to address hereditary or pediatric kidney cancers, although they must take into account that a proportion of adult patients may harbor a yet unrecognized hereditary form of renal cancer. The panel also recognizes the essential elements of adult cancer survivorship care now include not only monitoring for cancer recurrence, secondary cancers and treatment effects, but also the prevention of recurrences or new tumors, medical interventions for the consequences of cancer and its treatment effects, and the coordination between specialists and primary care physicians to meet survivors' needs.

- Patients undergoing follow-up for treated or observed renal masses should undergo a history and physical

examination directed at detecting signs and symptoms of metastatic spread or local recurrence.

- Patients undergoing follow-up for treated or observed renal masses should undergo basic laboratory testing to include blood urea nitrogen (BUN)/creatinine, urine analysis (UA) and estimated glomerular filtration rate (eGFR). Other laboratory evaluations, including complete blood count (CBC), lactate dehydrogenase (LDH), liver function tests (LFTs), alkaline phosphatase (ALP) and calcium level, may be used at the discretion of the clinician.
- Patients with progressive renal insufficiency on follow-up laboratory evaluation should be referred to nephrology.
- The panel recommends a bone scan in patients with an elevated alkaline phosphatase (ALP), clinical symptoms such as bone pain, and/or if radiographic findings are suggestive of a bony neoplasm.
- The panel recommends against the performance of a bone scan in the absence of an elevated alkaline phosphatase (ALP) or clinical symptoms, such as bone pain, or radiographic findings suggestive of a bone neoplasm.
- Patients with a history of a renal neoplasm presenting with acute neurological signs or symptoms must undergo **prompt** neurologic cross sectional CT or MRI scanning of the head or spine based on localization of symptomatology.
- The panel recommends against the routine use of molecular markers, such Ki-67, p-53 and VEGF, as benefits remain unproven at this time.

Surgery

Low risk patients (pT1, N0, Nx): Low risk is defined as organ-confined tumors (pT1, N0 or Nx) with negative or radiographically normal lymph nodes. These tumors have a risk of metastasis of less than 15% and an extremely low risk of local recurrence (less than 5%) in the absence of a positive surgical margin.

- Patients should undergo a baseline abdominal scan (CT or MRI) for nephron sparing surgery and abdominal imaging (US, CT or MRI) for radical nephrectomy within three to twelve months following renal surgery.
- Additional abdominal imaging (US, CT or MRI) may be performed in patients with low risk (pT1, N0, Nx) disease following a radical nephrectomy if the initial postoperative baseline image is negative.
- Abdominal imaging (US, CT, or MRI) may be performed yearly for three years in patients with low risk (pT1, N0, Nx) disease following a partial nephrectomy based on individual risk factors if the initial postoperative scan is negative.
- The panel recommends that patients with a history of low risk (pT1, N0, Nx) renal cell carcinoma undergo yearly chest x-ray to assess for pulmonary metastases for three years and only as clinically indicated beyond that time period.

Moderate to High Risk Patients (pT2-4N0 Nx or any stage N+): Moderate to high risk is defined as organ confined tumors greater than 7cm (pT2 N0 or Nx), non-organ confined tumors (pT3-4 N0 or Nx) with evidence of extension

beyond the renal capsule, into the perinephric fat, renal sinus, renal vein or inferior vena cava, or adjacent organ invasion including the ipsilateral adrenal gland, and/or any stage tumor with positive regional nodes (N+). Patients with these tumors have a higher risk of both local and metastatic recurrence, in the range of 30% to 70% and, therefore, are recommended to have an increased frequency of examinations due to a higher likelihood of primary treatment failure.

- The panel recommends that moderate to high risk patients undergo baseline chest and abdominal scan (CT or MRI) within three to six months following surgery with continued imaging (US, CXR, CT or MRI) every six months for at least three years and annually thereafter to year five.
- The panel recommends site -specific imaging as warranted by clinical symptoms suggestive of recurrence or metastatic spread.
- Imaging (US, CXR, CT or MRI) beyond five years may be performed at the discretion of the clinician for moderate to high risk patients.
- Routine FDG-PET scan is not indicated in the follow-up for renal cancer.

Active Surveillance

- Percutaneous biopsy may be considered in patients planning to undergo active surveillance.
- The panel recommends that patients undergo cross-sectional abdominal scanning (CT or MRI) within six months of active surveillance initiation to establish a growth rate. The panel further recommends continued

imaging (US, CT or MRI) at least annually thereafter.

- ✦ Importantly, with respect to tumor size measurements, differences of < 3.1 mm for inter-observer or < 2.3 mm for intra-observer evaluations are within the variability of measurement and should, therefore, not be attributed to tumor growth,¹⁰⁷ unless in the case where there are persistent increases over two or more interval exams.
- The panel recommends that patients on active surveillance with biopsy proven renal cell carcinoma or a tumor with oncocytic features undergo an annual chest x-ray to assess for pulmonary metastases.

Ablation

A local tumor recurrence following ablative therapy was defined as any localized disease remaining in the treated kidney at any point after the first ablation, as determined by a tumor with contrast enhancement after ablation, a visually enlarging lesion in the same area of treatment with or without the presence of contrast enhancement, the failure of an ablated lesion to regress in size over time, and or the development of new satellite or port site soft tissue nodules.

- A urologist should be involved in the clinical management of all patients undergoing renal ablative procedures including percutaneous ablation.
- The panel recommends that all patients undergoing ablation procedures for a renal mass undergo a pretreatment diagnostic biopsy.
- The standardized definition of “treatment failure or local recurrence” suggested in the Clinical T1 Guideline document should be adopted by clinicians. This should be further clarified to include a visually enlarging neoplasm

or new nodularity in the same area of treatment whether determined by enhancement of the neoplasm on post-treatment contrast imaging, or failure of regression in size of the treated lesion over time, new satellite or port site soft tissue nodules, or biopsy proven recurrence.

- The panel recommends that patients undergo cross-sectional scanning (CT or MRI) with and without IV contrast unless otherwise contraindicated at three and six months following ablative therapy to assess treatment success. This should be followed by annual abdominal scans (CT or MRI) thereafter for five years.
- Patients may undergo further scanning (CT or MRI) beyond five years based on individual patient risk factors.
- Patients undergoing ablative procedures who have either biopsy proven low risk renal cell carcinoma, oncocytoma, a tumor with oncocytic features, nondiagnostic biopsies or no prior biopsy, should undergo annual chest x-ray to assess for pulmonary metastases for five years. Imaging beyond five years is optional based on individual patient risk factors and the determination of treatment success.
- The panel recommends against further radiologic scanning in patients who underwent an ablative procedure with pathological confirmation of benign histology at or before treatment and who have radiographic confirmation of treatment success and no evidence of treatment related complications requiring further imaging.

- The alternatives of observation, repeat treatment and surgical intervention should be discussed, and repeat biopsy should be performed if there is radiographic evidence of treatment failure within six months if the patient is a treatment candidate.
- A progressive increase in size of an ablated neoplasm, with or without contrast enhancement, new nodularity in or around the treated zone, failure of the treated lesion to regress in size over time, satellite or port side lesions, should prompt lesion biopsy.

APPENDIX A: FOLLOW-UP PROTOCOL SUMMARY

Follow-Up Measure — Active Surveillance

Follow-Up Measure	Active Surveillance
Physical Exam and History	<ul style="list-style-type: none"> History and physical examination directed at detecting signs and symptoms of metastatic spread or local progression
Laboratory Testing	<ul style="list-style-type: none"> Basic laboratory testing to include BUN/creatinine, UA and eGFR; CBC, LDH, LFTs, ALP and calcium level tests may be used at the discretion of the physician; Progressive renal insufficiency should prompt a nephrology referral
CNS Scan¹	<ul style="list-style-type: none"> Acute neurological signs should undergo prompt neurologic cross sectional (CT or MRI) scan¹ of the head or spine based on localized symptomatology
Bone Scan	<ul style="list-style-type: none"> Elevated ALP, clinical symptoms such as bone pain, and/or radiographic findings suggestive of a bony neoplasm should prompt a bone scan; A bone scan should not be performed in the absence of these symptoms
Percutaneous Biopsy	<ul style="list-style-type: none"> Percutaneous biopsy should be considered prior to active surveillance
Abdominal Scan/¹ Imaging²	<ul style="list-style-type: none"> Cross-sectional abdominal scanning¹ (CT or MRI) within six months of active surveillance initiation to establish a growth rate with continued imaging² (US, CT or MRI) at least annually thereafter
Chest X-ray	<ul style="list-style-type: none"> Patients with biopsy proven RCC or a tumor with oncocytic features on active surveillance should undergo an annual chest x-ray to assess for pulmonary metastases

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- 1 In the context of this document, “scan” dictates the use of CT or MRI.
- 2 In the context of this document “imaging” dictates the use of abdominal or renal US, CT or MRI.

APPENDIX A: FOLLOW-UP PROTOCOL SUMMARY

Follow-Up Measure — Renal Ablation

Follow-Up Measure	Renal Ablation
Physical Exam and History	<ul style="list-style-type: none"> History and physical exam directed at detecting signs and symptoms of metastatic spread or local recurrence
Laboratory Testing	<ul style="list-style-type: none"> Basic laboratory testing to include BUN/creatinine, UA and eGFR; CBC, LDH, LFTs, ALP and calcium level tests may be used at the discretion of the physician; Progressive renal insufficiency should prompt a nephrology referral
CNS Scan¹	<ul style="list-style-type: none"> Acute neurological signs should prompt neurologic cross sectional (CT or MRI) scan¹ of the head or spine based on localized symptomatology
Bone Scan	<ul style="list-style-type: none"> Elevated ALP, clinical symptoms such as bone pain, and/or radiographic findings suggestive of a bony neoplasm should prompt a bone scan; A bone scan should not be performed in the absence of these symptoms
Diagnostic Biopsy	<ul style="list-style-type: none"> Patients should undergo a pretreatment diagnostic biopsy
Abdominal Scan¹	<ul style="list-style-type: none"> Cross-sectional scanning¹ (CT or MRI) with and without IV contrast unless otherwise contraindicated at three and six months following ablative therapy with continued scanning annually thereafter for five years; Scanning¹ beyond five years is optional based on individual risk factors
Chest Imaging²	<ul style="list-style-type: none"> Patients who have either biopsy proven low risk RCC, oncocytoma, a tumor with oncocytic features, nondiagnostic biopsies or no prior biopsy should undergo annual chest x-ray to assess for pulmonary metastases for five years; Imaging² (CXR or CT) beyond five years is optional based on individual patient risk factors and the determination of treatment success; Radiologic scanning is not recommended with pathological confirmation of benign disease at or before treatment and post treatment radiographic confirmation of treatment success and no evidence of treatment-related complications
Repeat Biopsy	<ul style="list-style-type: none"> New enhancement, a progressive increase in size of an ablated neoplasm with or without contrast enhancement, new nodularity in or around the treated zone, failure of the treated lesion to regress over time, satellite or port side lesions, should prompt a repeat lesion biopsy; Observation, repeat treatment and surgical intervention should be discussed

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- 1 In the context of this document, “scan” dictates the use of CT or MRI.
- 2 In the context of this document, “chest imaging” indicates the use of CXR or chest CT.

APPENDIX A: FOLLOW-UP PROTOCOL SUMMARY

Follow-Up Measure — Nephrectomy

Physical Exam and History	<ul style="list-style-type: none"> History and physical examination directed at detecting signs/symptoms of metastatic spread or local recurrence 	
Laboratory Testing	<ul style="list-style-type: none"> Basic laboratory testing to include BUN/creatinine, UA and eGFR; CBC, LDH, LFTs, ALP and calcium level tests may be used at the discretion of the physician; Progressive renal insufficiency should prompt a nephrology referral 	
CNS Scan	<ul style="list-style-type: none"> Acute neurological signs should prompt neurologic cross sectional (CT or MRI) scan¹ of the head or spine based on localized symptomatology 	
Bone Scan	<ul style="list-style-type: none"> Elevated ALP, clinical symptoms such as bone pain, and/or radiographic findings suggestive of a bony neoplasm should prompt a bone scan; A bone scan should not be performed in the absence of these symptoms 	
Follow-Up Measure	Low Risk	Moderate to High Risk
Abdominal Scanning/Imaging	<p>Partial Nephrectomy—Obtain a baseline abdominal scan¹ (CT or MRI) within three to twelve months following surgery;</p> <ul style="list-style-type: none"> If the initial postoperative scan is negative, abdominal imaging² (US, CT or MRI) may be performed yearly for three years based on individual risk factors <p>Radical Nephrectomy—Patients should undergo abdominal imaging² (US, CT or MRI) within three to twelve months following renal surgery;</p> <ul style="list-style-type: none"> If the initial postoperative imaging is negative, abdominal imaging² beyond twelve months may be performed at the discretion of the clinician 	<ul style="list-style-type: none"> A baseline abdominal scan¹ (CT or MRI) within three to six months following surgery with continued imaging² (US, CT or MRI) every six months for at least three years and annually thereafter to year five; Imaging² beyond five years may be performed at the discretion of the clinician; Perform site specific imaging as symptoms warrant
Chest Imaging/Scan	<ul style="list-style-type: none"> Obtain a yearly chest x-ray for three years and only as clinically indicated beyond that time period 	<ul style="list-style-type: none"> Obtain a baseline chest scan (CT) within three to six months following surgery with continued imaging² (CXR or CT) every six months for at least three years and annually thereafter to year five; Imaging² beyond five years is optional and should be based on individual patient characteristics and tumor risk factors

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- 1 In the context of this document, “scan” dictates the use of CT or MRI.
- 2 In the context of this document, “imaging” dictates the use of abdominal or renal US, CT or MRI.
- 3 In the context of this document, “chest imaging” indicates the use of CXR or chest CT.

APPENDIX D: DEFINITIONS USED IN THIS DOCUMENT

Indications for active surveillance: Indications for active surveillance include elderly patients, those with decreased life expectancy or those with medical comorbidities that would be associated with increased risk if a therapeutic intervention were to be undertaken. Alternatively, a strategy of observation with delayed intervention as indicated may be elected in order to determine the growth rate or to obtain alternative diagnostic imaging.

Standardized incidence ratio: incidence estimate (i.e. number of new cases in period of observation) in which the number of events (numerator) and the number of individuals at risk during the period of observation (denominator) are summarized across strata formed by the combination of adjustment variables (e.g. age groups, sex, race). (For more information the reader could be directed to:http://seer.cancer.gov/seerstat/WebHelp/Standardized_Incidence_Ratio_and_Confidence_Limits.htm)

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INTERSTITIAL CYSTITIS/ BLADDER PAIN SYNDROME (IC/BPS)

AUA Guideline (2011), Amended 2014

Interstitial Cystitis/Bladder Pain Syndrome (IC/BPS) is a potentially devastating condition that impacts not only a patient's physical function, but also their psychosocial function and quality of life. This Guideline aims to provide direction on IC/BPS recognition, appropriate diagnostic examination and treatment. IC/BPS patients experience pain, urgency, and frequency, and it is important that treatment approaches reduce these symptoms and increase patient quality of life without increasing adverse events and patient burden.

This Guideline addresses a topic which has not been addressed previously by AUA Guidelines. It provides a useful synthesis of the evidence along with panel guidance. The panel has emphasized that treatment of IC/BPS is individualized; the most effective approach for a particular patient is best determined by the individual clinician and patient. To guide physicians, the panel has developed a treatment algorithm which includes elements for a basic assessment as well as available first-line through sixth-line treatments.

Evaluation and Diagnosis of IC/BPS

- The basic assessment should include a careful history, physical examination, and laboratory examination to rule in symptoms that characterize IC/BPS and rule out other confusable disorders.

- Baseline voiding symptoms and pain levels should be obtained in order to measure subsequent treatment effects.
- Cystoscopy and/or urodynamics should be considered as an aid to diagnosis only for complex presentations; these tests are not necessary for making the diagnosis in uncomplicated presentations.

Strategies for the Treatment of IC/BPS

- Treatment strategies should proceed using more conservative therapies first, with less conservative therapies employed if symptom control is inadequate for acceptable quality of life; because of their irreversibility, surgical treatments (other than fulguration of Hunner's lesions) are appropriate only after other treatment alternatives have been exhausted, or at any time in the rare instance when an end-stage small, fibrotic bladder has been confirmed and the patient's quality of life suggests a positive risk-benefit ratio for major surgery.
- Initial treatment type and level should depend on symptom severity, clinician judgment, and patient preferences; appropriate entry points into the treatment portion of the algorithm depend on these factors.
- Multiple, simultaneous treatments may be considered if it is in the best interests of the patient; baseline symptom assessment and regular symptom level reassessment are essential to document efficacy of single and combined treatments.
- Ineffective treatments should be stopped once a clinically meaningful interval has elapsed.
- Pain management should be continually assessed for

effectiveness because of its importance to quality of life. If pain management is inadequate, then consideration should be given to a multidisciplinary approach and the patient referred appropriately.

- The IC/BPS diagnosis should be reconsidered if no improvement occurs after multiple treatment approaches.

Treatments that may be offered

Treatments that may be offered are divided into first-, second-, third-, fourth-, fifth-, and sixth-line groups based on the balance between potential benefits to the patient, potential severity of adverse events (AEs), and the reversibility of the treatment. See full Guideline for protocols, study details, and rationales.

First-line treatments

(Should be performed on all patients)

- Patients should be educated about normal bladder function, what is known and not known about IC/BPS, the benefits vs. risks/burdens of the available treatment alternatives, the fact that no single treatment has been found effective for the majority of patients, and the fact that acceptable symptom control may require trials of multiple therapeutic options (including combination therapy) before it is achieved.
- Self-care practices and behavioral modifications that can improve symptoms should be discussed and implemented as feasible.
- Patients should be encouraged to implement stress management practices to improve coping techniques and manage stress-induced symptom exacerbations.

Second-line treatments

- Appropriate manual physical therapy techniques (e.g., maneuvers that resolve pelvic, abdominal and/or hip muscular trigger points, lengthen muscle contractures, and release painful scars and other connective tissue restrictions), if appropriately-trained clinicians are available, should be offered to patients who present with pelvic floor tenderness. Pelvic floor strengthening exercises (e.g., Kegel exercises) should be avoided.
- Multimodal pain management approaches (e.g., pharmacological, stress management, manual therapy if available) should be initiated.
- Amitriptyline, cimetidine, hydroxyzine, or pentosan polysulfate may be administered as second-line oral medications (listed in alphabetical order; no hierarchy is implied).
- DMSO, heparin, or lidocaine may be administered as second-line intravesical treatments (listed in alphabetical order; no hierarchy is implied).

Third-line treatments

- Cystoscopy under anesthesia with short-duration, low-pressure hydrodistension may be undertaken if first- and second-line treatments have not provided acceptable symptom control and quality of life or if the patient's presenting symptoms suggest a more-invasive approach is appropriate.
- If Hunner's lesions are present, then fulguration (with laser or electrocautery) and/or injection of triamcinolone should be performed.

Fourth-line treatment

- Intradetrusor botulinum toxin A (BTX-A) may be administered if other treatments have not provided adequate symptom control and quality of life or if the clinician and patient agree that symptoms require this approach. Patients must be willing to accept the possibility that post-treatment intermittent self-catheterization may be necessary.
- A trial of neurostimulation may be performed and, if successful, implantation of permanent neurostimulation devices may be undertaken if other treatments have not provided adequate symptom control and quality of life or if the clinician and patient agree that symptoms require this approach.

Fifth-line treatments

- Cyclosporine A may be administered as an oral medication if other treatments have not provided adequate symptom control and quality of life or if the clinician and patient agree that symptoms require this approach.

Sixth-line treatment

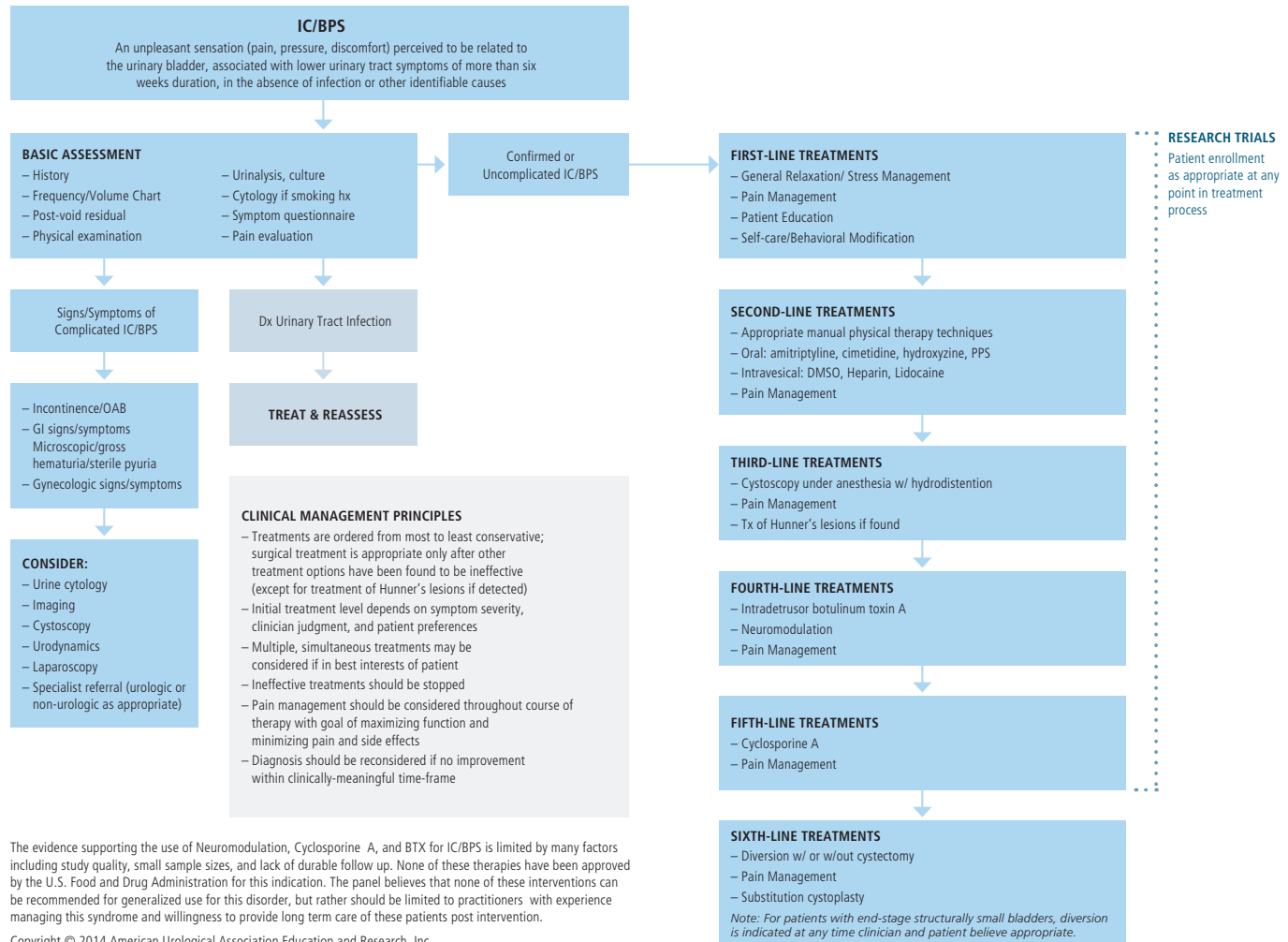
- Major surgery (e.g., substitution cystoplasty, urinary diversion with or without cystectomy) may be undertaken in carefully selected patients for whom all other therapies have failed to provide adequate symptom control and quality of life.

Treatments that should not be offered

The treatments below appear to lack efficacy and/or appear to be accompanied by unacceptable AE profiles. See body of Guideline for study details and rationales.

- Long-term oral antibiotic administration should not be offered.
- Intravesical instillation of bacillus Calmette-Guerin (BCG) should not be offered outside of investigational study settings.
- High-pressure, long-duration hydrodistension should not be offered.
- Systemic (oral) long-term glucocorticoid administration should not be offered.

Interstitial Cystitis Algorithm



The evidence supporting the use of Neuromodulation, Cyclosporine A, and BTX for IC/BPS is limited by many factors including study quality, small sample sizes, and lack of durable follow up. None of these therapies have been approved by the U.S. Food and Drug Administration for this indication. The panel believes that none of these interventions can be recommended for generalized use for this disorder, but rather should be limited to practitioners with experience managing this syndrome and willingness to provide long term care of these patients post intervention.

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OPTIMAL EVALUATION OF THE INFERTILE MALE

Best Practice Statement Reviewed and Validity Confirmed (2011)

Male infertility can be due to a variety of conditions. Some of these conditions are identifiable and specifically treatable or reversible, such as ductal obstruction and hypogonadotropic hypogonadism. Other conditions are identifiable but not reversible, such as bilateral testicular atrophy secondary to viral orchitis.

- The goals are to identify:
 - ♦ potentially correctable conditions,
 - ♦ irreversible conditions that are amenable to assisted reproductive techniques (ART) using the sperm of the male partner,
 - ♦ irreversible conditions that are not amenable to ART and for which donor insemination or adoption are possible options,
 - ♦ life- or health-threatening conditions that may underlie the infertility and require medical attention, and
 - ♦ genetic abnormalities that may affect the health of offspring if ART is employed.
- Perform *initial screening* evaluation if:
 - ♦ pregnancy has not occurred within one year of unprotected intercourse.
 - An earlier evaluation may be warranted if a known male or female infertility risk factor exists (e.g., cryptorchidism or female age >35 years) or if a man questions his fertility potential.

Initial screening includes:

- a reproductive history (coital frequency and timing, duration of infertility, and prior fertility, childhood illnesses and developmental history, systemic medical illnesses, prior surgeries, sexual history including sexually transmitted infections, gonadotoxin exposure including heat exposure), and
 - two semen analyses (Table 1).
- Perform *full evaluation* of male infertility if:
 - ✦ the initial screening evaluation is abnormal,
 - ✦ couples have unexplained infertility, and
 - ✦ infertility persists following treatment of a female factor.

Full evaluation includes:

- A medical history consisting of
 - a reproductive history (see above),
 - a complete medical and surgical history,
 - a review of medications (prescription and nonprescription) and allergies, lifestyle exposures and systems, family reproductive history, and past infections such as sexually transmitted diseases and respiratory infections.
- A focused physical examination (including penis, testes, vasa, epididymes, varicocele, secondary sex characteristics, and digital rectal examination),
- at least two semen analyses,
- other procedures and tests as needed to narrow differential diagnosis or help with prognosis.

- Other procedures and tests for assessing male fertility

Endocrine Evaluation (Table 2)

- ✦ Perform if:
 - sperm count is <10 million/mL,
 - sexual function is impaired,
 - clinical findings suggest a specific endocrinopathy.
 - ✦ The *initial* endocrine evaluation includes:
 - serum follicle-stimulating-hormone (FSH),
 - serum testosterone level; if low, repeat measurement of total and free (or bioavailable) testosterone and obtain serum luteinizing hormone (LH) and prolactin level.
- *Post-Ejaculatory Urinalysis* (UA)
 - ✦ Perform to diagnose possible retrograde ejaculation in patients with ejaculate volumes < 1.0 mL, except in patients with bilateral vasal ag nesis or clinical signs of hypogonadism.
 - *Transrectal Ultrasonography* (TRUS)
 - ✦ Perform in:
 - azoospermic patients with palpable vasa and low ejaculate volumes to identify ejaculatory duct obstruction.
 - *Scrotal Ultrasonography*
 - ✦ Perform if physical examination of the scrotum is difficult or inadequate or if a testicular mass is suspected.
 - Specialized Tests
 - ✦ *Sperm morphology* by rigid (strict) criteria is not consistently predictive of fecundity; do not use in isolation to make prognostic or therapeutic decisions.
 - ✦ *DNA integrity testing* (evaluation of degree of sperm DNA fragmentation): evidence to support routine use is insufficient.

- ◆ *Reactive oxygen species* (ROS) testing is not predictive of pregnancy independent of routine semen parameters nor are any therapies proven to correct an abnormal test result; data are insufficient to support the routine use of ROS testing.
- ◆ Specialized tests on semen (including leukocyte quantification, antisperm antibody testing, sperm viability, examination of sperm-cervical mucus interaction, zona-free hamster oocyte test/sperm penetration assay, human zona pellucid binding tests) are not required for routine diagnosis. May use individual tests in certain patients for identifying the etiology of specific semen parameter abnormalities or in cases of unexplained infertility or for selecting therapy.
- **Genetic Screening**
 - ◆ Most common genetic factors related to male infertility:
 - Cystic fibrosis gene mutations associated with congenital bilateral absence of the vas deferens (CBAVD).
 - Sex chromosomal abnormalities (aneuploidy) resulting in impaired sperm production and often with impaired testosterone production.
 - Y-chromosome microdeletions associated with isolated spermatogenic impairment.
 - ◆ Inform patients with:
 - Nonobstructive azoospermia or severe oligospermia that they might have chromosomal abnormalities or Y-chromosome microdeletions.
 - Azoospermia due to CBAVD that they probably have an abnormality of the cystic fibrosis transmembrane conductance regulator (CFTR) gene.

- ◆ Offer:
 - Genetic counseling and CFTR mutations testing for a patient with CBAVD and to the female partner before proceeding with treatments that utilize the sperm of a man with CBAVD.
 - Include at minimum a panel of common point mutations and the 5T allele; currently there is no consensus on the minimum number of mutations that should be tested.
- ◆ Imaging for renal abnormalities to men with unilateral vassal agenesis or CBAVD and no evidence of CFTR abnormalities.
- ◆ Gene sequencing may be considered in couples where the wife is a carrier and the husband with CBAVD tests negative on a routine panel of CFTR mutations.
- ◆ Karyotyping and genetic counseling to patients with nonobstructive azoospermia and severe oligospermia (<5 million sperm/mL).
- ◆ Y-chromosome microdeletion analysis to men with nonobstructive azoospermia or severe oligospermia.
 - There are insufficient data to recommend a minimal number of sequence tagged sites to test for in patients undergoing Y chromosome microdeletion analysis.
 - Although the prognosis for sperm retrieval is poor in patients having large deletions involving AZF region a or b, the results of Y chromosome deletion analysis cannot absolutely predict the absence of sperm.

EVALUATION OF AZOOSPERMIC MALE

Best Practice Statement; Reviewed and Revised (2011)

- Absence of the vasa deferentia (vasal agenesis)
 - ✦ Consider TRUS in patients with unilateral vasal agenesis for evaluation of the ampullary portion of the existing vas deferens and the seminal vesicles since these patients may have segmental atresia of the vas deferens causing obstructive azoospermia.
 - ✦ Offer genetic counseling and testing for CFTR mutations to male and also to female partner before proceeding with treatments that use sperm of a man with CBAVD.
 - ✦ Imaging of the kidneys for abnormalities should be offered to men with unilateral vasal agenesis or to men with CBAVD and no evidence of CFTR abnormalities.
- Bilateral testicular atrophy
 - ✦ Offer genetic testing (chromosomal abnormalities and Y-chromosome microdeletions) to patients with non-obstructive azoospermia due to primary testicular failure (FSH levels elevated with normal or low serum testosterone).
 - ✦ Evaluate patients with acquired hypogonadotropic hypogonadism (low FSH, bilaterally small testes and low serum testosterone levels) for functioning and nonfunctioning pituitary tumors by serum prolactin measurement and pituitary gland imaging.

- Ductal obstruction

In patients with normal ejaculate volume (> 1.0 mL), normal testicular size, at least one palpable vas deferens, and normal FSH levels:

- ✦ Perform diagnostic testicular biopsy to distinguish between obstructive and nonobstructive causes.
- ✦ Vasography should not be performed at the time of biopsy unless reconstructive surgery is undertaken at the same time.

In patients with low ejaculate volume (<1.0 mL) not caused by hypogonadism or CBAVD and palpable vasa perform:

- ✦ TRUS with or without seminal vesicle aspiration and seminal vesiculography to identify obstruction in the distal male reproductive tract,
- ✦ testis biopsy in patients with ejaculatory duct obstruction demonstrated by TRUS, if needed to confirm normal spermatogenesis.
- ✦ alternatively, vasography to identify the site of reproductive tract obstruction but not unless reconstructive surgery is undertaken at the same surgical procedure.
- ✦ CFTR and 5T testing in patients with a unilateral absence of the vas and low volume azoospermia due to the possibility of a variant of CBAVD; if positive, do not perform TRUS.

MANAGEMENT OF OBSTRUCTIVE AZOOSPERMIA

Best Practice Statement; Reviewed and Validity Confirmed (2011)

- Treatment options include:
 - ◆ Surgery
 - microsurgical reconstruction of the reproductive tract
 - transurethral resection of the ejaculatory ducts (TURED)
 - ◆ Sperm retrieval techniques and in vitro fertilization/ intracytoplasmic sperm injection (IVF/ICSI) (Table 3)
 - There is no evidence that either fertilization or pregnancy rates are different using either fresh or thawed cryopreserved sperm. Base the timing of sperm retrieval in relation to oocyte retrieval on local preference and expertise.
 - There is no evidence that the site or method of sperm retrieval affects outcome of IVF with ICSI for patients with obstructive azoospermia. Base the choice of sperm retrieval by either percutaneous or open surgery from either the testis or epididymis on local preferences and expertise.
 - Open surgical testicular sperm retrieval with or without microscopic magnification is recommended for patients with nonobstructive azoospermia.
 - The patient should be apprised of the associated risks of IVF/ICSI.
- Microsurgical reconstruction is preferable to sperm retrieval with IVF/ICSI in men with prior vasectomy if the obstructive interval is less than 15 years and no female fertility risk factors are present.

- ◆ If epididymal obstruction is present, the decision to use either microsurgical reconstruction or sperm retrieval with IVF/ICSI should be individualized.
- ◆ Vasoepididymostomy should be performed by an expert in reproductive microsurgery.
 - Sperm retrieval/ICSI is preferred to surgical treatment in cases
- ◆ of advanced female age,
- ◆ of female factors requiring IVF,
- ◆ if the chance for success with sperm retrieval/ICSI exceeds the chance for success with surgical treatment, or
- ◆ if sperm retrieval/ICSI is preferred by the couple for financial reasons.

TABLE 1.

Semen Analysis: Reference Values

On at least two occasions (> 1 month apart, if possible):

Ejaculate volume	1.5-5.0 ml
pH	> 7.2
Sperm concentration	>20 million/ml
Total sperm number	>40 million/ejaculate
Percent motility	>50%
Forward progression	>2 (scale 0-4)
Normal morphology	>50% normal*
	>30% normal**
	>14% normal***
And:	
Sperm agglutination	< 2 (Scale 0-3)
Viscosity	<3 (Scale 0-4)

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*World Health Organization, 1987 **World Health Organization, 1992

***Kruger (Tygerberg) Strict Criteria, World Health Organization, 1999

TABLE 2.

Endocrine Evaluation: The Relationship of Testosterone, LH, FSH and Prolactin with Clinical Condition

Clinical Condition	FSH	LH	Testosterone	Prolactin
Normal spermatogenesis	Normal	Normal	Normal	Normal
Hypogonadotropic hypogonadism	Low	Low	Low	Normal
Abnormal spermatogenesis*	High/Normal	Normal	Normal	Normal
Complete testicular failure/hypergonadotropic hypogonadism	High	High	Normal/Low	Normal
Prolactin-secreting pituitary tumor	Normal/Low	Normal/Low	Low	High

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* Many men with abnormal spermatogenesis have a normal serum FSH, but a marked elevation of serum FSH is clearly indicative of an abnormality in spermatogenesis.

TABLE 3.

Obstructive Azoospermia: Sperm Retrieval Techniques

	Advantages	Disadvantages
Microsurgical epididymal sperm aspiration (MESA)	Large quantity of sperm obtained suitable for several IVF/ICSI cycles in one procedure	Requires microsurgical skills Incision with post-op discomfort Higher cost compared to percutaneous procedures
Percutaneous epididymal sperm aspiration (PESA)	No microsurgical skills required Fast Minimum post-op discomfort	Fewer sperm retrieved Risk of epididymal damage
Testicular sperm extraction (TESE) and microTESE	No microsurgical skills required except when microTESE performed	Risk of testicular damage with multiple biopsies Incision with post-op discomfort Higher cost compared to percutaneous procedures
Percutaneous testicular sperm aspiration (TESA)	No microsurgical skills required Fast and easy post-op discomfort Minimally invasive	Fewer sperm retrieved

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REPORT ON VARICOCELE AND INFERTILITY

Best Practice Statement (2001); Reviewed and Validity Confirmed (2012)

- Potential benefits of varicocele treatment:
 - ✦ varicocele treatment should be offered to appropriate infertile couples because:
 - varicocele repair has been proven to improve semen parameters in most men
 - varicocele treatment may possibly improve fertility
 - the risks of varicocele treatment are small
- Varicocele treatment (repair) should be offered:
 - ✦ when all of the following are present:
 - varicocele is palpable
 - couple has documented infertility
 - female has normal fertility or potentially correctable infertility
 - male has >1 abnormal semen parameter or sperm function test results
 - ✦ in adult men with a palpable varicocele and abnormal semen analyses but not currently attempting to conceive
 - ✦ in adolescents with objective evidence of reduced ipsilateral testicular size
- Varicocele monitoring should be offered:
 - ✦ in young men with normal semen analyses; repeat semen analyses every one to two years
 - ✦ in adolescents with normal ipsilateral testicular size
- Treatment options include:

- ✦ varicocele repair (surgery or percutaneous embolization) (this is the primary option in a man with suboptimal semen quality and a normal female partner)
- ✦ IVF with or without ICSI (this is the primary treatment option when there is an independent need for IVF/ICSI)
- Follow-up:
 - ✦ analyze semen at three-month intervals for at least one year or until pregnancy occurs
 - ✦ consider intrauterine insemination and ART if infertility persists after anatomically successful varicocele repair

TABLE 1.

Semen Analysis: Reference Values

On at least two occasions	
Ejaculate volume	1.5-5.0 ml
pH	> 7.2
Sperm concentration	>20 million/ml
Total sperm number	>40 million/ejaculate
Percent motility	>50%
Forward progression	>2 (scale 0-4)
Normal morphology	>50% normal*
	>30% normal**
	>14% normal***
And:	
Sperm agglutination	< 2 (Scale 0-3)
Viscosity	<3 (Scale 0-4)

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*World Health Organization, 1987 **World Health Organization, 1992

***Kruger (Tygerberg) Strict Criteria, World Health Organization, 1999

TABLE 2.

Endocrine Evaluation of Infertility

Clinical Condition	FSH	LH	Testosterone	Prolactin
Normal spermatogenesis	Normal	Normal	Normal	Normal
Hypogonadotropic hypogonadism	Low	Low	Low	Normal
Abnormal spermatogenesis*	High/Normal	Normal	Normal	Normal
Complete testicular failure/hypergonadotropic hypogonadism	High	High	Normal/Low	Normal
Prolactin-secreting pituitary tumor	Normal/Low	Normal/Low	Low	High

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* Many men with abnormal spermatogenesis have a normal serum FSH, but a marked elevation of serum FSH is clearly indicative of an abnormality in spermatogenesis.

MALE URETHRAL STRICTURE

(2016)

Purpose

Urethral stricture is chronic fibrosis and narrowing of the urethral lumen caused by acute injury, inflammatory conditions, and iatrogenic interventions including urethral instrumentation or surgery and prostate cancer treatment. The symptoms of urethral stricture are non-specific, and may overlap with other common conditions including lower urinary tract symptoms (LUTS) and urinary tract infection (UTI) to confound timely diagnosis. Urologists play a key role in the initial evaluation of urethral stricture and currently provide all accepted treatments. Thus, urologists must be familiar with the diagnostic tests for urethral stricture as well as endoscopic and open approaches to initial presentation and management of treatment failure. This guideline provides evidence based direction to clinicians and patients regarding how to recognize symptoms and signs of a urethral stricture, carry out appropriate testing to determine the location and severity of the stricture, and recommend the best options for treatment. The most effective approach for a particular patient is best determined by the individual clinician and patient in the context of that patient's history, values, and goals for treatment. As the science relevant to urethral stricture evolves and improves, the strategies presented here will be amended to remain consistent with the highest standards of clinical care.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Guideline Statements:

Diagnosis/Initial Management

- Clinicians should include urethral stricture in the differential diagnosis of men who present with decreased urinary stream, incomplete emptying, dysuria, urinary tract infection (UTI), and after rising post void residual. (*Moderate Recommendation; Evidence Level: Grade C*)
- After performing a history, physical examination and urinalysis, clinicians may use a combination of patient

reported measures, uroflowmetry, and ultrasound post void residual assessment in the initial evaluation of suspected urethral stricture. (*Clinical Principle*)

- Clinicians should use urethro-cystoscopy, retrograde urethrography, voiding cystourethrography or ultrasound urethrography to make a diagnosis of urethral stricture. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians planning non-urgent intervention for a known stricture should determine the length and location of the urethral stricture. (*Expert Opinion*)
- Surgeons may utilize urethral endoscopic management (e.g. urethral dilation or direct visual internal urethrotomy [DVIU]) or immediate suprapubic cystostomy for urgent management of urethral stricture, such as discovery of systematic urinary retention or catheterization prior to another surgical procedure. (*Expert Opinion*)
- Surgeons may place a suprapubic (SP) cystostomy prior to definitive urethroplasty in patients dependent on an indwelling urethral catheter or intermittent self-dilation. (*Expert Opinion*)

Dilation/Internal Urethrotomy/Urethroplasty

- Surgeons may offer urethral dilation, DVIU, or urethroplasty for the initial treatment of a short (< 2 cm) bulbar urethral stricture. (*Conditional Recommendation; Evidence Level: Grade C*)
- Surgeons may perform either dilation or DVIU when performing endoscopic treatment of a urethral stricture. (*Conditional Recommendation; Evidence Level: Grade C*)

- Surgeons may safely remove the urethral catheter within 72 hours following uncomplicated dilation or DVIU. *(Conditional Recommendation; Evidence Level: Grade C)*
- In selected patients who are not candidates for urethroplasty, clinicians may recommend self-catheterization after DVIU to maintain urethral patency. *(Conditional Recommendation; Evidence Level: Grade C)*
- Surgeons should offer urethroplasty, instead of repeated endoscopic management for recurrent anterior urethral strictures following failed dilation or DVIU. *(Moderate Recommendation; Evidence Level: Grade C)*
- Surgeons who do not perform urethroplasty should offer patients referral to centers with expertise. *(Expert Opinion)*

Anterior Urethral Reconstruction

- Surgeons may initially treat meatal or fossa navicularis strictures with either dilation or meatotomy. *(Clinical Principle)*
- Surgeons should offer urethroplasty to patients with recurrent meatal or fossa navicularis strictures. *(Moderate Recommendation; Evidence Level: Grade C)*
- Surgeons should offer urethroplasty to patients with penile urethral strictures, because of the expected high recurrence rates with endoscopic treatments. *(Moderate Recommendation; Evidence Level: Grade C)*
- Surgeons should offer urethroplasty as the initial treatment for patients with long (≥ 2 cm) bulbar urethral strictures, given the low success rate of DVIU or dilation. *(Moderate Recommendation; Evidence Level: Grade C)*

- Surgeons may reconstruct long multi-segment strictures with one stage or staged techniques using oral mucosal grafts, penile fasciocutaneous flaps or a combination of these techniques. *(Moderate Recommendation; Evidence Level: Grade C)*
- Surgeons may offer perineal urethrostomy as a long term treatment option to patients as an alternative to urethroplasty. *(Conditional Recommendation; Evidence Level: Grade C)*
- Surgeons should use oral mucosa as the first choice when using grafts for urethroplasty. *(Expert Opinion)*
- Surgeons should not perform substitution urethroplasty with allograft, xenograft, or synthetic materials except under experimental protocols. *(Expert Opinion)*
- Surgeons should not perform a single-stage tubularized graft urethroplasty. *(Expert Opinion)*
- Surgeons should not use hair-bearing skin for substitution urethroplasty. *(Clinical Principle)*

Pelvic Fracture Urethral Injury

- Clinicians should use retrograde urethrography with voiding cystourethrogram and/or retrograde + antegrade cystoscopy for preoperative planning of urethroplasty after pelvic fracture urethral injury (PFUI). *(Moderate Recommendation; Evidence Level: Grade C)*
- Surgeons should perform delayed urethroplasty instead of delayed endoscopic procedures after urethral obstruction/obliteration due to PFUI. *(Expert Opinion)*
- Definitive urethral reconstruction for PFUI should be planned only after major injuries stabilize. *(Expert Opinion)*

Bladder Neck Contracture/Vesicourethral Stenosis

- Surgeons may perform a dilation, bladder neck incision or transurethral resection for bladder neck contracture after endoscopic prostate procedure. (*Expert Opinion*)
- Surgeons may perform a dilation, vesicourethral incision, or transurethral resection for post-prostatectomy vesicourethral anastomotic stenosis. (*Conditional Recommendation; Evidence Level: Grade C*)
- Surgeons may perform open reconstruction for recalcitrant stenosis of the bladder neck or post-prostatectomy vesicourethral anastomotic stenosis. (*Conditional Recommendation; Evidence Level: Grade C*)

Special Circumstances

- In men who require chronic self-catheterization (e.g. neurogenic bladder), surgeons may offer urethroplasty as a treatment option for urethral stricture causing difficulty with intermittent self-catheterization. (*Expert Opinion*)
- Clinicians may perform biopsy for suspected lichen sclerosis (LS), and must perform biopsy if urethral cancer is suspected. (*Clinical Principle*)
- In LS proven urethral stricture, surgeons should not use genital skin for reconstruction. (*Strong Recommendation; Evidence Level: Grade B*)

Post-operative Follow-up

- Clinicians should monitor urethral stricture patients to identify symptomatic recurrence following dilation, DVIU or urethroplasty. (*Expert Opinion*)

DIAGNOSIS AND TREATMENT OF OVERACTIVE BLADDER (NON-NEUROGENIC) IN ADULTS

AUA/SUFU Guideline (2012). This document was amended in February 2014 to reflect literature that was released since the original publication of this guideline in May 2012.

Purpose

This guideline's purpose is to provide direction to clinicians and patients regarding how to: recognize non-neurogenic overactive bladder (OAB); conduct a valid diagnostic process; and, approach treatment with the goals of maximizing symptom control and patient quality of life while minimizing adverse events and patient burden. There is continually expanding literature on OAB; the Panel notes that this document constitutes a clinical strategy and is not intended to be interpreted rigidly. The most effective approach for a particular patient is best determined by the individual clinician and patient. As the science relevant to OAB evolves and improves, the strategies presented here will require amendment to remain consistent with the highest standards of clinical care. This document was created to serve as a guide for all types of providers who evaluate and treat OAB patients, including those in general practice as well as those who specialize in various branches of medicine.

Guideline Statements

Diagnosis

- The clinician should engage in a diagnostic process to document symptoms and signs that characterize OAB and exclude other disorders that could be the cause of the patient's symptoms; the minimum requirements for this process are a careful history, physical exam and urinalysis.
- In some patients, additional procedures and measures may be necessary to validate an OAB diagnosis, exclude other disorders, and fully inform the treatment plan. At the clinician's discretion, a urine culture and/or post-void residual assessment may be performed and information from bladder diaries and/or symptom questionnaires may be obtained.
- Urodynamics, cystoscopy, and diagnostic renal and bladder ultrasound should not be used in the initial workup of the uncomplicated patient.
- OAB is not a disease; it is a symptom complex that generally is not a life threatening condition. After assessment has been performed to exclude conditions requiring treatment and counseling, no treatment is an acceptable choice made by some patients and caregivers.
- Clinicians should provide education to patients regarding normal lower urinary tract function, what is known about OAB, the benefits vs. risks/burdens of the available treatment alternatives, and the fact that acceptable symptom control may require trials of multiple therapeutic options before it is achieved.

Treatment

First-Line Treatments

- Clinicians should offer behavioral therapies (e.g., bladder training, bladder control strategies, pelvic floor muscle training, fluid management) as first line therapy to all patients with OAB.
- Behavioral therapies may be combined with pharmacologic management.

Second-Line Treatments

- Clinicians should offer oral anti-muscarinics, or β_3 -adrenoceptor agonists as second-line therapy.
- If an immediate release (IR) and an extended release (ER) formulation are available, then ER formulations should preferentially be prescribed over IR formulations because of lower rates of dry mouth.
- Transdermal (TDS) oxybutynin (patch [now available to women ages 18 years and older without a prescription] or gel) may be offered.
- If a patient experiences inadequate symptom control and/or unacceptable adverse drug events with one anti-muscarinic medication, then a dose modification or a different anti-muscarinic medication or a β_3 -adrenoceptor agonist may be tried.
- Clinicians should not use anti-muscarinics in patients with narrow angle glaucoma unless approved by the treating ophthalmologist and should use anti-muscarinics with extreme caution in patients with impaired gastric emptying or a history of urinary retention.

- Clinicians should manage constipation and dry mouth before abandoning effective anti-muscarinic therapy. Management may include bowel management, fluid management, dose modification, or alternative anti-muscarinics.
- Clinicians must use caution in prescribing anti-muscarinics in patients who are using other medications with anti-cholinergic properties.
- Clinicians should use caution in prescribing anti-muscarinics or β 3-andrenoceptor agonists in the frail OAB patient.
- Patients who are refractory to behavioral and pharmacologic therapy should be evaluated by an appropriate specialist if they desire additional therapy.

Third-line Treatments

- Clinicians may offer intradetrusor onabotulinumtoxinA (1000 IU) as third-line treatment in the carefully-selected and thoroughly-counseled patient who has been refractory to first- and second-line OAB treatments. The patient must be able and willing to return for frequent post-void residual evaluation and able and willing to perform self-catheterization if necessary.
- Clinicians may offer peripheral tibial nerve stimulation (PTNS) as third line treatment in a carefully selected patient population.
- Clinicians may offer sacral neuromodulation (SNS) as third line treatment in a carefully selected patient population characterized by severe refractory OAB symptoms or patients who are not candidates for second-

line therapy and who are willing to undergo a surgical procedure.

- Practitioners and patients should persist with new treatments for an adequate trial in order to determine whether the therapy is efficacious and tolerable. Combination therapeutic approaches should be assembled methodically, with the addition of new therapies occurring only when the relative efficacy of the preceding therapy is known. Therapies that do not demonstrate efficacy after an adequate trial should be ceased.

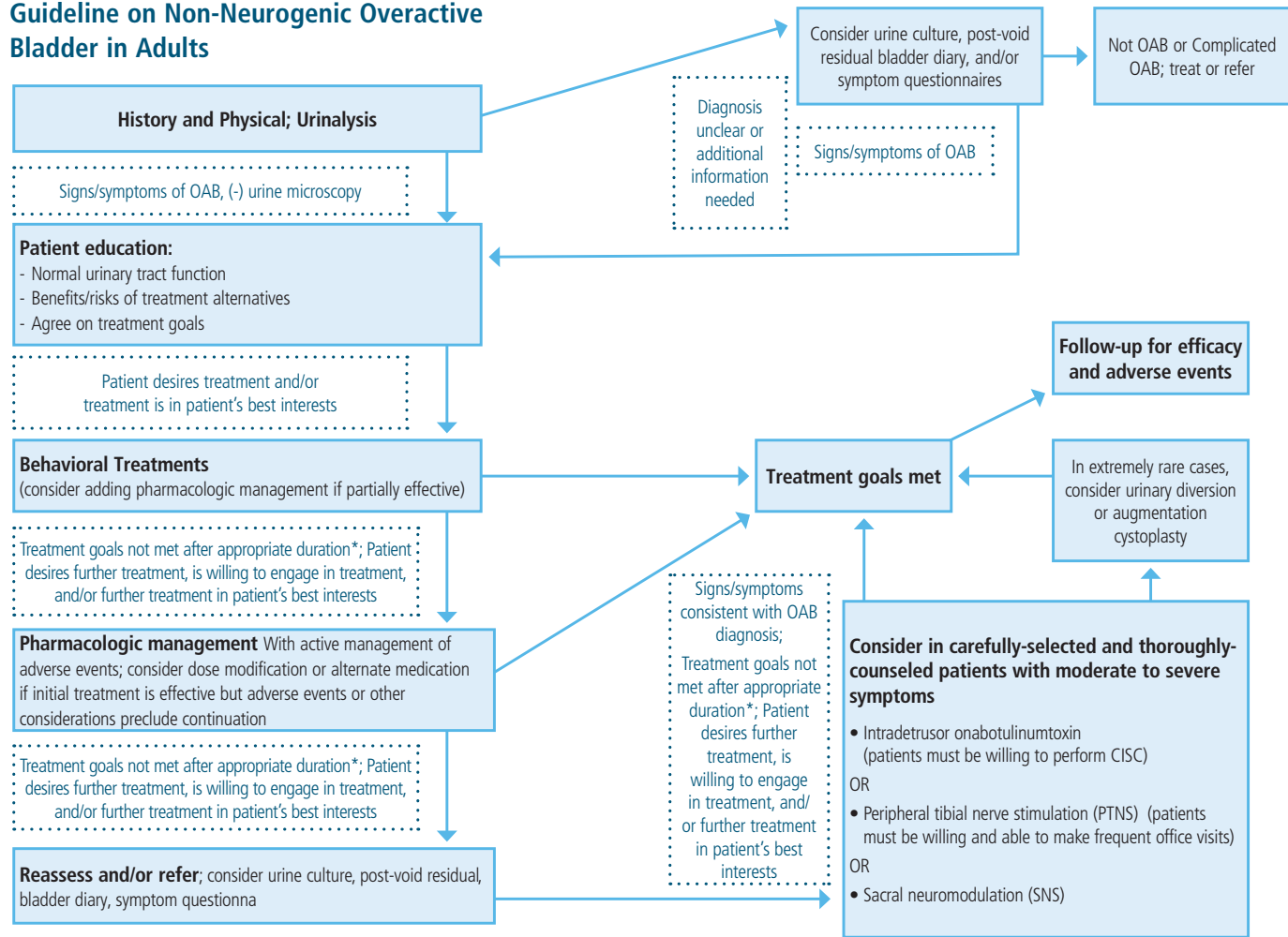
Additional Treatments

- Indwelling catheters (including transurethral, suprapubic, etc.) are not recommended as a management strategy for OAB because of the adverse risk/benefit balance except as a last resort in selected patients.
- In rare cases, augmentation cystoplasty or urinary diversion for severe, refractory, complicated OAB patients may be considered.

Follow-Up

- The clinician should offer follow up with the patient to assess compliance, efficacy, side effects and possible alternative treatments.

Diagnosis & Treatment Algorithm: AUA/SUFU Guideline on Non-Neurogenic Overactive Bladder in Adults



The complete OAB Guideline is available at www.AUAnet.org/Guidelines.

*Appropriate duration is 8 to 12 weeks for behavioral therapies and 4 to 8 weeks for pharmacologic therapies

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DIAGNOSIS AND TREATMENT OF PEYRONIE'S DISEASE

AUA Guideline (2015)

Purpose

This guideline's purpose is to provide direction to clinicians and patients regarding how to recognize Peyronie's Disease (PD), conduct a valid diagnostic process, and approach treatment with the goals of maximizing symptom control, sexual function, and patient and partner quality of life while minimizing adverse events and patient and partner burden. The strategies and approaches recommended in this document were derived from evidence-based and consensus-based processes. There is a continually expanding literature on PD; the Panel notes that this document constitutes a clinical strategy and is not intended to be interpreted rigidly. The most effective approach for a particular patient is best determined by the individual clinician and patient in the context of that patient's history, values, and goals for treatment. As the science relevant to PD evolves and improves, the strategies presented here will be amended to remain consistent with the highest standards of clinical care.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net

benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Guideline Statements

Diagnosis

- Clinicians should engage in a diagnostic process to document the signs and symptoms that characterize PD. The minimum requirements for this examination are a careful history (to assess penile deformity, interference with intercourse, penile pain, and/or distress) and a physical exam of the genitalia (to assess for palpable abnormalities of the penis). (*Clinical Principle*)
- Clinicians should perform an in-office intracavernosal injection (ICI) test with or without duplex Doppler ultrasound prior to invasive intervention. (*Expert Opinion*)
- Clinicians should evaluate and treat a man with PD only when he/she has the experience and diagnostic tools to appropriately evaluate, counsel, and treat the condition. (*Expert Opinion*)

Treatment

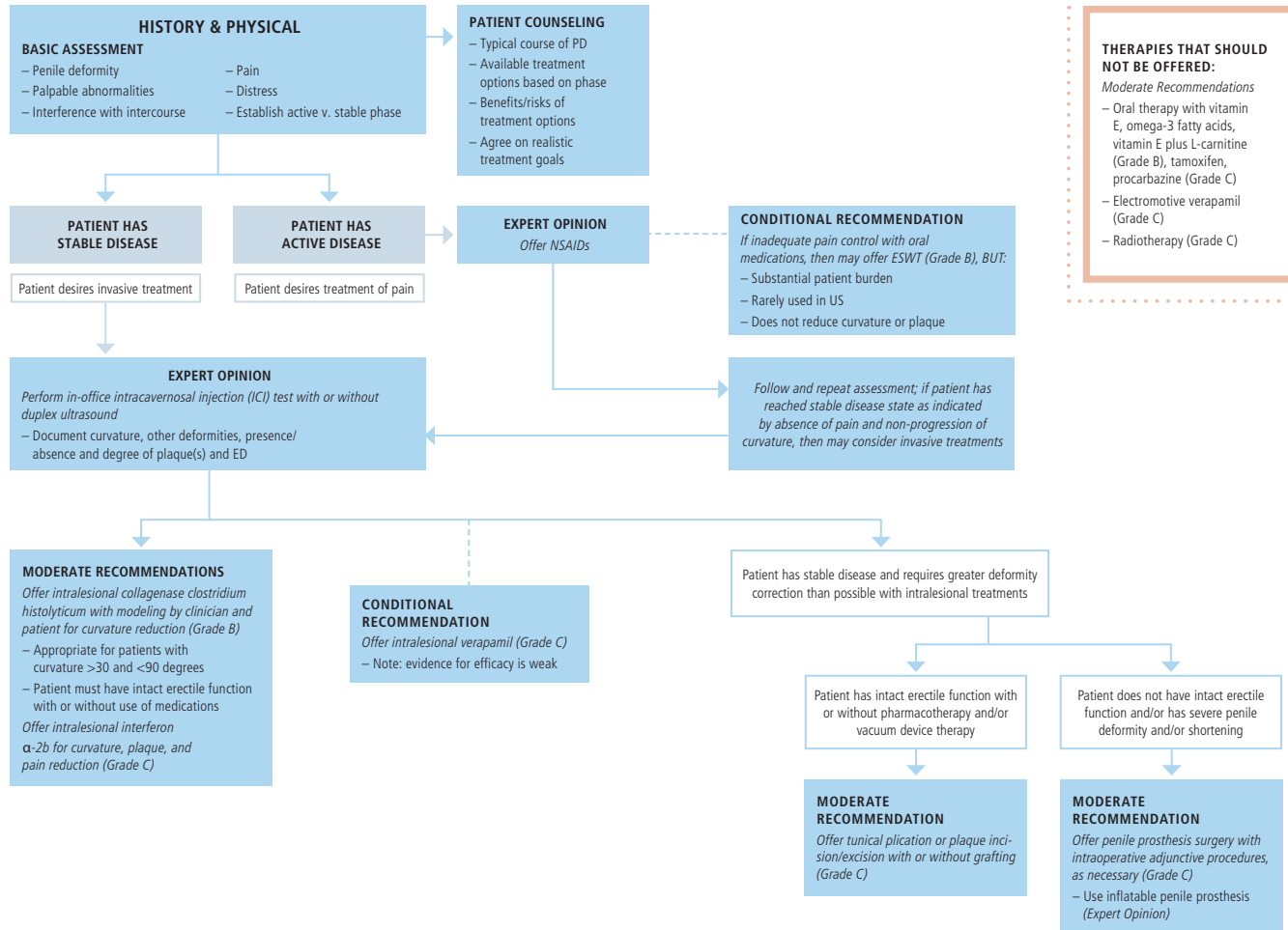
- Clinicians should discuss with patients the available treatment options and the known benefits and risks/burdens associated with each treatment. (*Clinical Principle*)
- Clinicians may offer oral non-steroidal anti-inflammatory medications to the patient suffering from active PD who is in need of pain management. (*Expert Opinion*)
- Clinicians should not offer oral therapy with vitamin E, tamoxifen, procarbazine, omega-3 fatty acids, or a combination of vitamin E with L-carnitine. [*Moderate Recommendation; Evidence Level: Grade B (vitamin E) / B (omega-3 fatty acids) / B (Vitamin E + propionyl-L-carnitine) / C (tamoxifen) / C (procarbazine)*]
- Clinicians should not offer electromotive therapy with verapamil. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians may administer intralesional collagenase clostridium histolyticum in combination with modeling by the clinician and by the patient for the reduction of penile curvature in patients with stable PD, penile curvature $>30^\circ$ and $<90^\circ$, and intact erectile function (with or without the use of medications). (*Moderate Recommendation; Evidence Level: Grade B*)
- Clinicians should counsel patients with PD prior to beginning treatment with intralesional collagenase regarding potential occurrence of adverse events, including penile ecchymosis, swelling, pain, and corporal rupture. (*Clinical Principle*)

- Clinicians may administer intralesional interferon α -2b in patients with PD. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should counsel patients with PD prior to beginning treatment with intralesional interferon α -2b about potential adverse events, including sinusitis, flu-like symptoms and minor penile swelling. (*Clinical Principle*)
- Clinicians may offer intralesional verapamil for the treatment of patients with PD. (*Conditional Recommendation; Evidence Level: Grade C*)
- Clinicians should counsel patients with PD prior to beginning treatment with intralesional verapamil about potential adverse events, including penile bruising, dizziness, nausea and pain at the injection site. (*Clinical Principle*)
- Clinicians should not use extracorporeal shock wave therapy (ESWT) for the reduction of penile curvature or plaque size. (*Moderate Recommendation; Evidence Level: Grade B*)
- Clinicians may offer ESWT to improve penile pain. (*Conditional Recommendation; Evidence Level: Grade B*)
- Clinicians should not use radiotherapy (RT) to treat PD. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should assess patients as candidates for surgical reconstruction based on the presence of stable disease. (*Clinical Principle*)
- Clinicians may offer tunical plication surgery to patients whose rigidity is adequate for coitus (with or without pharmacotherapy and/or vacuum device therapy) to

improve penile curvature. (*Moderate Recommendation; Evidence Level: Grade C*)

- Clinicians may offer plaque incision or excision and/or grafting to patients with deformities whose rigidity is adequate for coitus (with or without pharmacotherapy and/or vacuum device therapy) to improve penile curvature. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians may offer penile prosthesis surgery to patients with PD with erectile dysfunction (ED) and/or penile deformity sufficient to prevent coitus despite pharmacotherapy and/or vacuum device therapy. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians may perform adjunctive intra-operative procedures, such as modeling, plication or incision/grafting, when significant penile deformity persists after insertion of the penile prosthesis. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should use inflatable penile prosthesis for patients undergoing penile prosthetic surgery for the treatment of PD. (*Expert Opinion*)

Peyronie's Guideline Algorithm



PHARMACOLOGIC MANAGEMENT OF PREMATURE EJACULATION

AUA Guideline (2004); Reviewed and Validity Confirmed (2010)

Premature ejaculation (PE) is one of the most common male sexual disorders. Because a universally accepted definition of PE has yet to be established, for the purposes of this Guideline, the panel defined PE as the following: ejaculation that occurs sooner than desired, either before or shortly after penetration, causing distress to either one or both partners. Although the exact etiology of PE is unknown, treatments have encompassed psychological, behavioral and pharmacologic interventions. The present recommendations address pharmacologic therapies only.

Patient Evaluation

The diagnosis of PE is based on sexual history alone.

Obtain a detailed sexual history from all patients with ejaculatory complaints.

- Components of the historical evaluation:
 - ♦ frequency and duration of PE
 - ♦ relationship to specific partners
 - ♦ occurrence with all or some attempts
 - ♦ degree of stimulus resulting in PE
 - ♦ nature and frequency of sexual activity
 - ♦ impact of PE on sexual activity

- ◆ types and quality of personal relationships and quality of life
- ◆ aggravating or alleviating factors
- ◆ relationship to drug use or abuse
- Determine whether erectile dysfunction (ED) is a concurrent problem. In patients with concomitant PE and ED, treat ED first.
- Laboratory or physiological testing is not required unless the history and physical examination reveal indications beyond uncomplicated PE.

Patient Management

Patient and partner satisfaction is the primary target outcome for treatment.

- Reassure the patient and, if possible, his partner that PE is common and treatable.
- Inform the patient of the treatment options and their risk and benefits prior to any intervention:
The selective serotonin reuptake inhibitors (fluoxetine, paroxetine, and sertraline), a tricyclic antidepressant (clomipramine) and topical anesthetic agents (lidocaine/prilocaine cream) (Table 1) can be used to effectively treat PE.
- Base treatment choice on both physician judgment and patient preference.

Medical Treatment

Serotonin Reuptake Inhibitors (SRIs) – Selective and Nonselective

- Whether continuous or situational dosing is more effective is unclear. Choice of regimen is based on frequency of sexual activity. The optimal interval for situational dosing before intercourse has not been established.
- Therapy most likely will be needed on a continuing basis. PE usually returns upon discontinuing therapy.
- Although the adverse effects of the SRIs have been well-described in the management of clinical depression, consider the following facts when prescribing these agents for PE:
 - ◆ Evidence to date suggests that adverse event profiles for SRIs in the treatment of PE are similar to those reported in patients with depression (nausea, dry mouth, drowsiness and reduced libido).
 - ◆ Doses effective in the treatment of PE are usually lower than those recommended in the treatment of depression.
 - ◆ Adverse event profiles may differ among patients depending on the dosing regimen prescribed (continuous daily dosing or situational dosing).
- Pharmacodynamic drug interactions resulting in a “serotonergic syndrome” have been reported rarely with the concomitant use of monoamine oxidase inhibitors, lithium, sumatriptan and tryptophan. Pharmacokinetic interactions resulting in alterations of drug blood levels may occur with the anticonvulsants, benzodiazepines, cimetidine, tricyclic antidepressants, antipsychotic agents,

tolbutamide, antiarrhythmics and warfarin, especially in elderly patients.

- None of the SRIs have been approved by the U.S. Food and Drug Administration for the treatment of PE.

Topical Anesthetic Agents

- Should be applied to the penis prior to intercourse and used with or without a condom. The condom may be removed and penis washed clean prior to intercourse.
- Prolonged application (30 to 45 minutes) may result in loss of erection due to numbness. Diffusion of residual topical anesthetic into the vaginal wall may produce numbness of the partner.

TABLE 1.

Medical Therapy Options for the Treatment of Premature Ejaculation*

Oral Therapies	Trade Names†	Recommended Dose‡§
Nonselective Serotonin Reuptake Inhibitor		
Clomipramine	Anafranil®	25 to 50 mg/day or 25 mg 4 to 24 h pre-intercourse
Selective Serotonin Reuptake Inhibitors		
Fluoxetine	Prozac®, Sarafem®	5 to 20 mg/day
Paroxetine	Paxil®	10, 20, 40 mg/day or 20 mg 3 to 4 h pre-intercourse
Sertraline	Zoloft®	25 to 200 mg/day or 50 mg 4 to 8 h pre-intercourse
Topical Therapies		
Lidocaine/ prilocaine cream	EMLA® Cream	Lidocaine 2.5%/prilocaine 2.5% 20 to 30 minutes pre-intercourse

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* This list does not reflect order of choice or efficacy.

† Trade names listed may not be all-inclusive.

‡ Peak plasma concentrations occur 2 to 8 hours (h) postdose and half-lives range from 1 to 3 days.

§ Titrate doses from low to high based on response.

Medical therapies currently employed in the management of PE have not been approved by the U.S. Food and Drug Administration for this indication. Treatment with oral antidepressants should be started at the lowest possible dose that is compatible with success.

PRIAPISM

AUA Guideline (2003); Reviewed and Validity Confirmed (2010)

Priapism, a relatively uncommon disorder, is a medical emergency. Although not all forms of priapism require immediate intervention, ischemic priapism is associated with progressive fibrosis of the cavernosal tissues and with erectile dysfunction. Therefore, all patients with priapism should be evaluated emergently in order to intervene as early as possible in those patients with ischemic priapism. The goal of the management of all patients with priapism is to achieve detumescence and preserve erectile function. Unfortunately, some of the treatments aimed at correcting priapism have the potential complication of erectile dysfunction. Current treatment modalities represent a range of options that are applied in a step-wise pattern, with increasing invasiveness and risk balanced against the likelihood of prolonged ischemia and permanent damage to the corpora cavernosa if treatment is absent or delayed.

Evaluation of Priapism

Perform historical, physical and laboratory/radiologic evaluations to differentiate ischemic from nonischemic priapism (Table 1).

- Components of the *historical evaluation*:
 - ♦ duration of erection
 - ♦ degree of pain
 - ♦ previous history of priapism and its treatment

- ◆ use of drugs that may have precipitated the episode
- ◆ history of pelvic, genital or perineal trauma
- ◆ history of sickle cell disease or other hematologic abnormality
- Components of the *physical examination*:
 - ◆ focused examination of the genitalia, perineum and abdomen
 - abdominal, pelvic and perineal examination may reveal evidence of trauma or malignancy
- Components of *laboratory/radiologic evaluation*:
 - ◆ CBC
 - ◆ reticulocyte count
 - ◆ hemoglobin electrophoresis
 - ◆ psychoactive medication screening
 - ◆ urine toxicology
 - ◆ blood gas testing (Table 2)
 - ◆ color duplex ultrasonography
 - ◆ penile arteriography

Management of Priapism

An algorithm for the management of ischemic and nonischemic priapism is presented in Figure 1.

Ischemic Priapism

Ischemic priapism is a nonsexual, persistent erection characterized by little or no cavernous blood flow and abnormal cavernous blood gases.

- In patients with underlying disorders (e.g., sickle cell disease, hematologic malignancy), intracavernous treatment of ischemic priapism should be undertaken

concurrently with systemic treatment of the underlying disorder.

- Therapeutic aspiration (with or without irrigation), or intracavernous injection of sympathomimetics (e.g., phenylephrine) may be used as initial intervention.
- If priapism persists following aspiration/irrigation, perform intracavernous injection of sympathomimetic drugs and repeat if needed prior to initiating surgical intervention.
- Phenylephrine is recommended as the sympathomimetic agent of choice for intracavernous injection to minimize cardiovascular side effects.
 - ◆ In adult patients, dilute with normal saline to a concentration of 100 to 500 µg/mL. Inject every 3 to 5 minutes for approximately 1 hour before determining treatment failure.
 - ◆ Children and patients with severe cardiovascular diseases require smaller volumes or lower concentrations.
 - ◆ Observe patients for subjective symptoms and objective findings consistent with known undesirable effects of these agents.
 - ◆ Blood pressure and electrocardiogram monitoring are recommended in high-risk patients.
- Consider use of surgical shunts after intracavernous injections of sympathomimetics has failed.
 - ◆ Consider cavernoglanular (corporoglanular) shunt as first choice. Perform with a large biopsy needle or scalpel inserted percutaneously through the glans.
 - ◆ Oral systemic therapy is not indicated for treatment of ischemic priapism.

Nonischemic Priapism

Nonischemic priapism is an uncommon form of priapism caused by unregulated arterial flow. It may follow perineal trauma that results in laceration of the cavernous artery. In many patients, there is no underlying cause. The erections associated with nonischemic priapism are typically neither fully rigid nor painful. Nonischemic priapism is not an emergency and will often resolve without treatment.

- Corporal aspiration has only a diagnostic role. Aspiration with or without injection of sympathomimetic agents is not recommended as treatment.
- Initial management should be observation.
 - ◆ Discuss the following with the patient prior to treatment: chances for spontaneous resolution, risks of treatment-related erectile dysfunction and lack of significant consequences expected from delaying intervention.
- Perform selective arterial embolization at request of patient; autologous clot and absorbable gels (nonpermanent therapies) are preferable.
- Consider surgery as a last resort: perform with intraoperative color duplex ultrasonography.

Stuttering Priapism

Stuttering (or intermittent) priapism is a recurrent form of ischemic priapism in which unwanted painful erections occur repeatedly with intervening periods of detumescence.

- Treat each episode as described for ischemic priapism.
- Trials of gonadotropin-releasing hormone agonists or antiandrogens may be used, but have not been fully tested. Hormonal agents should not be used in patients

who have not achieved full sexual maturation and adult stature.

- Consider intracavernous self-injection of phenylephrine in patients who either fail or reject systemic treatment of stuttering priapism.

TABLE 1.

Key Findings in the Evaluation of Priapism

Finding	Ischemic Priapism	Nonischemic Priapism
Corpora cavernosa fully rigid	●	•
Penile pain	●	•
Abnormal cavernous blood gases	●	•
Blood abnormalities and hematologic malignancy	◆	•
Recent intracavernous vasoactive drug injections	◆	•
Chronic, well-tolerated tumescence without full rigidity	•	●
Perineal trauma	•	◆

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● Usually present; ◆ Sometimes present; • Seldom present

TABLE 2.

Typical Blood Gas Values

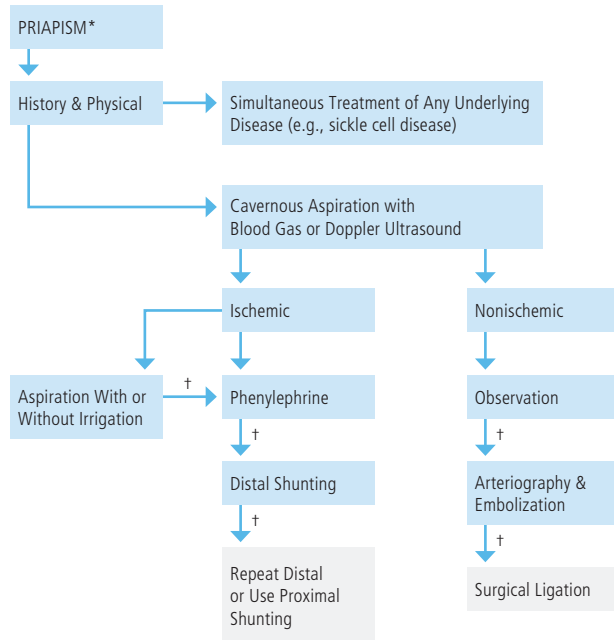
Source	Po ₂ (mm Hg)	Pco ₂ (mm Hg)	pH
Ischemic priapism (cavernous blood)*	<30	>60	<7.25
Normal arterial blood (room air)	>90	<40	7.40
Normal mixed venous blood (room air)	40	50	7.35

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*Broderick & Harkaway, 1994.

FIGURE 1.

Management of Priapism



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* Erection greater than 4 hours duration.

† Proceed upon treatment failure.

CASTRATION-RESISTANT PROSTATE CANCER

AUA Guideline (2013), Amended 2014 and 2015

Note to the Reader:

This document was amended in April 2014 and March 2015 to reflect literature that was released since the original publication of this guideline in May 2013. This document will continue to be periodically updated to reflect the growing body of literature related to this disease.

On July 21, 2014, the FDA issued a recommendation that health care professionals should consider the alcohol content of docetaxel when prescribing or administering the drug to patients.

On July 26, 2013, the FDA issued a safety announcement related to the use of ketoconazole in the form of oral tablets. Side effects can include hepatotoxicity, adrenal insufficiency and dangerous drug interactions.

Index Patient 1

Asymptomatic non-metastatic CRPC

One of the first clinical presentations of Castration-Resistant Prostate Cancer (CRPC) occurs in a patient with a rising PSA despite medical or surgical castration. This is typically defined as a patient with a rising PSA and no radiologic evidence of metastatic prostate cancer. The Prostate Cancer Clinical Trials Working Group 2 (PCWG2) defines PSA only failure as a rising PSA that is greater than 2ng/mL higher than the nadir, the rise has to be at least 25% over nadir

and the rise has to be confirmed by a second PSA at least three weeks later. In addition, the patient is required to have castrate levels of testosterone (less than 50 ng/mL) and no radiographic evidence of metastatic disease. These patients represent a relatively common clinical presentation and the earliest clinical manifestation of castration resistance, but to date, there are no randomized trials showing an overall survival benefit in this patient population from a particular form of treatment.

- *Clinicians should recommend observation with continued androgen deprivation to patients with non-metastatic CRPC.*
- *Clinicians may offer treatment with first-generation anti-androgens (flutamide, bicalutamide and nilutamide) or first generation androgen synthesis inhibitors (ketoconazole + steroid) to select patients with non-metastatic CRPC who are unwilling to accept observation.*
- *Clinicians should not offer systemic chemotherapy or immunotherapy to patients with non-metastatic CRPC outside the context of a clinical trial.*

Index Patient 2

Asymptomatic or minimally symptomatic, mCRPC without prior docetaxel chemotherapy

This patient represents a common clinical presentation seen in the CRPC setting today. These patients are characterized as having a rising PSA in the setting of castrate levels of testosterone, documented metastatic disease on radiographic imaging and no prior treatment with docetaxel chemotherapy for CRPC. The key distinction between this patient and

Index Patients 3 and 4 is symptom status. Specifically, this patient is defined as having no symptoms or mild symptoms attributable to his prostate cancer. However, one must then consider whether the patient requires regular opioid pain medications for symptoms thought to be attributable to documented metastases to achieve this level of pain control. In general, if patients require regular narcotic medications for pain relief, they are not included in this category.

- *Clinicians should offer abiraterone + prednisone, enzalutamide, docetaxel, or sipuleucel-T to patients with asymptomatic or minimally symptomatic mCRPC with good performance status and no prior docetaxel chemotherapy.*
- *Clinicians may offer first-generation anti-androgen therapy, ketoconazole + steroid or observation to patients with asymptomatic or minimally symptomatic mCRPC with good performance status and no prior docetaxel chemotherapy who do not want or cannot have one of the standard therapies.*

Index Patient 3

Symptomatic, mCRPC with good performance status and no prior chemotherapy

These patients have a rising PSA in the setting of castrate levels of testosterone, documented symptomatic metastatic disease on radiographic imaging, and no prior history of docetaxel chemotherapy for prostate cancer. The definition of symptomatic disease warrants additional explanation to contrast with Index Patient. First, the patient must have symptoms that are clearly attributable to the metastatic

disease burden, not any other medical condition. Second, if having pain, the patient should require regular opiate pain medications for symptoms attributable to documented metastases in order to achieve an acceptable level of pain control. If patients require regular narcotic medications for pain relief, then they are symptomatic from their prostate cancer and should be included in this category.

- *Clinicians should offer abiraterone+prednisone, enzalutamide or docetaxel to patients with symptomatic, mCRPC with good performance status and no prior docetaxel chemotherapy.*
- *Clinicians may offer ketoconazole + steroid, mitoxantrone or radionuclide therapy to patients with symptomatic, mCRPC with good performance status and no prior docetaxel chemotherapy who do not want or cannot have one of the standard therapies.*
- *Clinicians should offer radium-223 to patients with symptoms from bony metastases from mCRPC with good performance status and no prior docetaxel chemotherapy and without known visceral disease.*
- *Clinicians should not offer treatment with either estramustine or sipuleucel-T to patients with symptomatic, mCRPC with good performance status and no prior docetaxel chemotherapy.*

Index Patient 4

Symptomatic, mCRPC with poor performance status and no prior docetaxel chemotherapy

Clinical trials have generally excluded patients with a poor performance status (ECOG 3-4) from participation. Thus,

most data regarding management of such patients is extrapolated from randomized trials of eligible patients who had a better performance status, as well as from some smaller trials and registries. Even a phase III clinical trial that was presumptively designed for a population considered “unfit” for docetaxel (ALSYMPCA to evaluate radium-223) still only allowed a performance status of ECOG 0-1. However, treatments with acceptable safety profiles do exist and should be considered, even in poor performance status patients. This is especially true in those patients in whom the poor performance status may be considered to be directly related to the cancer itself, and thus whose status might improve with effective treatment. Treatments must be individually tailored in these patients, after a careful discussion of risks and benefits with particular attention to patient quality of life.

- *Clinicians may offer treatment with abiraterone + prednisone or enzalutamide to patients with symptomatic, mCRPC with poor performance status and no prior docetaxel chemotherapy.*
- *Clinicians may offer treatment with ketoconazole + steroid or radionuclide therapy to patients with symptomatic, mCRPC with poor performance status and no prior docetaxel chemotherapy who are unable or unwilling to receive abiraterone + prednisone or enzalutamide.*
- *Clinicians may offer docetaxel or mitoxantrone chemotherapy to patients with symptomatic mCRPC with poor performance status and no prior docetaxel chemotherapy in select cases, specifically when the performance status is directly related to the cancer.*

- Clinicians may offer radium-223 to patients with symptoms from bony metastases from mCRPC with poor performance status and no prior docetaxel chemotherapy and without known visceral disease in select cases, specifically when the performance status is directly related to symptoms related to bone metastases.
- Clinicians should not offer sipuleucel-T to patients with symptomatic, mCRPC with poor performance status and no prior docetaxel chemotherapy.

Index Patient 5

Symptomatic, mCRPC with good performance status and prior docetaxel chemotherapy

As patients with prostate cancer receive hormonal therapy earlier in the course of the disease (frequently for non-metastatic disease), they may actually develop castrate-resistant disease (based on serologic progression) with non-metastatic or asymptomatic metastatic disease. Thus, additional agents, including docetaxel chemotherapy may be administered earlier in the course of metastatic disease. These trends have resulted in a population of mCRPC patients who have completed docetaxel and may continue to be asymptomatic or minimally symptomatic with an excellent performance status. While such patients may be healthy enough to receive a number of subsequent therapies, a focus of therapy should also be to maintain their excellent performance status without significant toxicity from additional therapy. It is in this context that providers should choose from a number of additional therapies to offer to this patient population.

- Clinicians should offer treatment with abiraterone + prednisone, cabazitaxel or enzalutamide to patients with mCRPC with good performance status who have received prior docetaxel chemotherapy. If the patient received abiraterone + prednisone prior to docetaxel chemotherapy, they should be offered cabazitaxel or enzalutamide.
- Clinicians may offer ketoconazole + steroid to patients with mCRPC with good performance status who received prior docetaxel chemotherapy if abiraterone + prednisone, cabazitaxel or enzalutamide is unavailable.
- Clinicians may offer retreatment with docetaxel to patients with mCRPC with good performance status who were benefitting at the time of discontinuation (due to reversible side effects) of docetaxel chemotherapy.
- Clinicians should offer radium-223 to patients with symptoms from bony metastases from mCRPC with good performance status who received prior docetaxel chemotherapy and without known visceral disease.

Index Patient 6

Symptomatic, mCRPC with poor performance status and prior docetaxel chemotherapy

The American Society of Clinical Oncology (ASCO) has posted recommendations regarding treatment for patients with advanced solid tumors; particularly in the last months of life. ASCO advocates for an increasing emphasis on a patient's quality of life and concentrates on symptom management. Treatment given in the last months of life may delay access to end of life care, increase costs and add unnecessary symptom management. Patients with poor performance status (ECOG 3 or 4) should not be offered further treatment.

- Clinicians should offer palliative care to patients with mCRPC with poor performance status who received prior docetaxel chemotherapy. Alternatively, for selected patients, clinicians may offer treatment with abiraterone + prednisone, enzalutamide, ketoconazole + steroid or radionuclide therapy.
- Clinicians should not offer systemic chemotherapy or immunotherapy to patients with mCRPC with poor performance status who received prior docetaxel chemotherapy.

Guideline Statements on Bone Health (notspecific to any one index patient)

Several factors conspire to place the average patient with metastatic prostate cancer at a higher risk of bone complications. First, the median age of onset of the disease is in the late 60s, meaning that the average patient with metastatic disease may be in the 70s (or beyond), clearly a population at risk of physiologic, age-related decreases in bone mineral density. Secondly, a primary therapeutic intervention in patients with recurrent disease, androgen deprivation therapy, is associated with progressive loss of bone mineral density, not infrequently to the point of measurable osteopenia or frank osteoporosis, increasing the patient's fracture risk, even in patients with non-metastatic disease. Finally, in patients with advanced disease, bones are the most common site of metastatic disease, with as many as 70% of patients at some point in their course demonstrating evidence of disease in this site.

- Clinicians should offer preventative treatment (e.g.

supplemental calcium, Vitamin D) for fractures and skeletal related events to CRPC patients.

- Clinicians may choose either denosumab or zoledronic acid when selecting a preventative treatment for skeletal related events for CRPC patients with bony metastases.

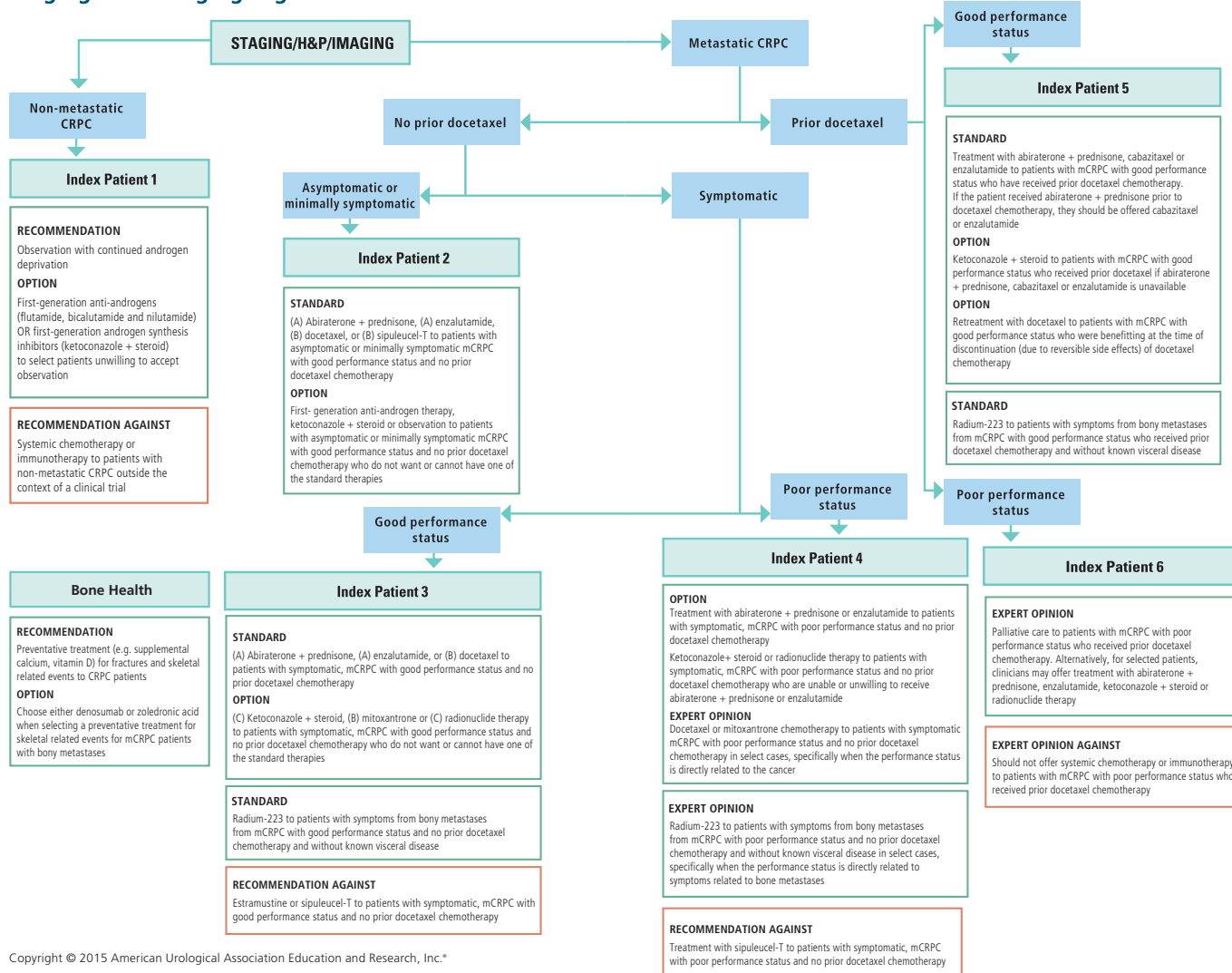
APPENDIX A: ECOG PERFORMANCE STATUS

ECOG PERFORMANCE STATUS*

Grade	ECOG
0	Fully active, able to carry on all pre-disease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work
2	Ambulatory and capable of all selfcare but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited selfcare, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any selfcare. Totally confined to bed or chair
5	Dead

* As published in Am. J. Clin. Oncol.: Oken, M.M., Creech, R.H., Tormey, D.C., Horton, J., Davis, T.E., McFadden, E.T., Carbone, P.P.: Toxicity And Response Criteria Of The Eastern Cooperative Oncology Group. Am J Clin Oncol 5:649-655, 1982.

Staging/H&P/Imaging Algorithm



EARLY DETECTION OF PROSTATE CANCER

AUA Guideline (2013)

Purpose

This guideline addresses prostate cancer early detection for the purpose of reducing prostate cancer mortality with the intended user as the urologist. This document does not make a distinction between early detection and screening for prostate cancer. Early detection and screening both imply detection of disease at an early, pre-symptomatic stage when a patient would have no reason to seek medical care –an intervention referred to as secondary prevention. It is important to note that the guideline statements listed in this document target patients at average risk, defined as a man without risk factors, such as a family history of prostate cancer in multiple generations and/or family history of early onset below age 55 years, or African American race. This document does not address detection of prostate cancer in symptomatic men, where symptoms imply those that could be related to locally advanced or metastatic prostate cancer (e.g., new onset bone pain and/or neurological symptoms involving the lower extremities, etc.).

- **The panel recommends against PSA screening in men under age 40 years.**

None of the prospective randomized studies evaluating the benefits of PSA based screening for prostate cancer included men under age 40 years. Hence there are no data available to estimate the benefit of prostate cancer screen-

ing in this population. However, the harms that can accrue from screening, which include the side effects of diagnostic biopsies, and perhaps subsequent treatment will certainly apply to men in this age group who would be subject to screening. Therefore, due to the relatively low prevalence of clinically detectable prostate cancer in men below age 40 years, the absence of any evidence demonstrating benefits of screening and the known harms, screening is discouraged for men under age 40 years of age.

- **The panel does not recommend routine screening in men between ages 40 to 54 years at average risk.**

Given the panel's interpretation of the evidence concerning the benefits and harms of annual screening in men age 40 to 54 years who are not at an increased risk for prostate cancer and the rarity of fatal prostate cancers arising in this age group, we do not recommend this practice as a routine. The panel recognizes that certain subgroups of men age 40 to 54 years may realize added benefit from earlier screening. For example, men at increased risk for prostate cancer, such as those with a strong family history or those of African-American race, may benefit from earlier detection, given their higher incidence of disease.

The panel recognizes that there may be other benefits associated with screening that we either did not consider or have not been demonstrated by the current literature. The "absence of evidence does not constitute evidence of absence" and, as such, we are not explicitly stating that screening should be actively discouraged in this group of patients. The literature in this area is quite dynamic and

future studies may document additional benefits in this younger population.

- **For men ages 55 to 69 years the panel recognizes that the decision to undergo PSA screening involves weighing the benefits of preventing prostate cancer mortality in 1 man for every 1,000 men screened over a decade against the known potential harms associated with screening and treatment. For this reason, the panel strongly recommends shared decision-making for men age 55 to 69 years that are considering PSA screening, and proceeding based on men's values and preferences.**

Although there are considerable harms associated with screening, the panel feels that in men age 55 to 69 years, there was sufficient certainty that the benefits of screening could outweigh the harms that a recommendation of shared decision-making in this age group was justified. The panel believes that the test should not be offered in a setting where this is not practical, for example community-based screening by health systems or other organizations.

Shared decision making should include a discussion of the man's baseline mortality risk from other co-morbid conditions, his individual risk for prostate cancer given his race/ethnicity and family history, and the degree to which screening might influence his overall life expectancy and chance of experiencing morbidity from prostate cancer or its treatment.

- **To reduce the harms of screening, a routine screening interval of two years or more may be preferred over annual screening in those men who have participated in shared decision-making**

and decided on screening. As compared to annual screening, it is expected that screening intervals of two years preserve the majority of the benefits and reduce overdiagnosis and false positives.

Modeling studies have projected that screening men every two years preserves the majority (at least 80%) of lives saved compared with annual screening while materially reducing the number of tests, the chance of a false positive test and overdiagnosis. This is supported by indirect evidence from the two largest screening trials, although there is no direct evidence from these trials supporting a specific screening interval.

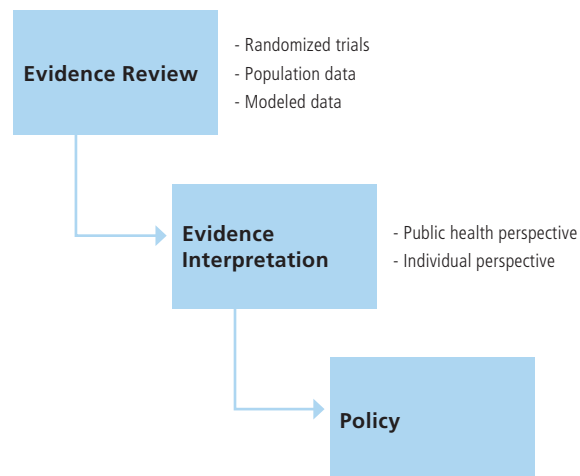
- **The panel does not recommend routine PSA screening in men age 70+ years or any man with less than a 10 to 15 year life expectancy.**

The panel recognizes that men age 70+ years can have a life-expectancy over 10 to 15 years and that a small subgroup of men age 70+ years who are in excellent health may benefit from PSA screening, but evidence to support the magnitude of benefit in this age group is extremely limited. The rationale for this recommendation is based on the absence of evidence of a screening benefit in this population with clear evidence of harms. Men in this age group who choose to be screened should recognize that there is strong evidence that the ratio of harm to benefit increases with age and that the likelihood of overdiagnosis is extremely high, particularly among men with low-risk disease. In order to identify the older man more likely to benefit from treatment if screening takes place, the panel recommends two

approaches: 1) increasing the prostate biopsy threshold (e.g., 10ng/ml); and 2) discontinuation of PSA screening among men with a PSA below 3ng/ml.

FIGURE 1.

Influence of evidence and interpretation on policy creation



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TABLE 2.

Evidence profile for mortality outcomes

Outcome	Source & setting*	Relative risk	Absolute effect	Quality of evidence
Prostate cancer-specific mortality	1 RCT (ERSPC) ¹⁷ 162,243 men <u>Age 55-69</u> , PSA every four years	0.80 (0.65–0.98) ⁼	1 death fewer per 1000 men screened	Moderate
	1 RCT (PLCO) ¹⁸ 76,693 men <u>Age 55-74</u> , annual PSA screening for six years and digital rectal examination annually for four years	1.14 (0.76, 1.70)	From 1 death fewer to 1 death more per 1000 men screened	Low*

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*The quality of evidence regarding prostate cancer-specific mortality derived from PLCO is low due to methodological limitations relating to the degree of contamination in the control arm. Therefore, PLCO does not provide a direct comparison of screening v. not screening. Rates of screening in the control group increased from 40% in the first year to 52% in the sixth year for PSA testing and ranged from 41 to 46% for digital rectal examination.

* After a median follow-up of 11 years in the core age group, relative risk reduction 21% (RR, 0.79; 0.68 to 0.91), and 29% after adjustment for contamination and noncompliance. Absolute risk reduction 1.07/ 1000 screened.

TABLE 3.

Harm Outcomes

Adverse event	Estimate	Definition (data source)	Quality of evidence supporting association*
False positive tests	75.9%	Proportion of men with PSA >3.0 ng/mL and no cancer on subsequent biopsy (ERSPC) ¹⁷	Moderate to High
	12%	Cumulative risk of at least 1 false-positive test (PSA > 4.0 µg/L) after 3 rounds of testing every four years (Finnish center, ERSPC) ¹⁷	
	13%	Cumulative risk of at least 1 false-positive test (PSA > 4.0 µg/L) after 4 rounds of annual testing (PLCO) ¹⁸	
	5.5%	Risk for undergoing at least 1 biopsy due to a false-positive test (PLCO) ¹⁸	
Overdiagnosis	66%	Cases overdiagnosed as a fraction of screen-detected cases (ERSPC (Rotterdam) age 55-67 years, four year screening interval) ³²	Moderate
	23-42%	Cases overdiagnosed as a fraction of screen-detected cases (SEER-9, 1987-2000) ²⁵	
Lead time	5.4-6.9 years	Average time by which screening advances diagnosis among cases who would have been diagnosed during their lifetimes in the absence of screening (SEER-9, 1987-2000) ²⁵	Moderate
Minor (hematuria/hematospermia)	20-50%	20-50% (first time sextant biopsy, Netherland site, ERSPC) ¹⁷ 24-45% (ERSPC, Rotterdam) ²⁷	High
Composite medical complications (infection, bleeding, urinary difficulties)	68/10,000	PLCO ³³	High
Fever post biopsy	3.5-4.2%	3.5% (ERSPC) ¹⁷ 4.2% ²⁷ (ERSPC, Rotterdam)	High
Hospitalization post biopsy	4%	Loeb et al. and Nam et al. ^{27,28}	High

Copyright © 2013 American Urological Association Education and Research, Inc.® The core age group, 136,689 screening tests were performed (average, 2.27 per subject). Of these tests, 16.6% were positive, and 85.9% of the men with positive tests underwent prostate biopsy.

*The quality of evidence means how much confidence we have in the reported quantitative estimate. It does not mean the methodological quality of the study(s) although the latter is one factor that affects confidence in the estimate.

CLINICALLY LOCALIZED PROSTATE CANCER

AUA/ASTRO/SUO Guideline (2017)

Risk stratification for prostate cancer should include all available pertinent data, which for most patients will include PSA, clinical stage, Grade Group on biopsy, number of cores involved, maximum involvement of any single core, PSA density, and imaging.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

TABLE 1.

Risk Stratification for Localized Prostate Cancer

Very Low Risk	PSA <10 ng/ml AND Grade Group 1 AND clinical stage T1-T2a AND <34% of biopsy cores positive AND no core with >50% involved, AND PSA density <0.15 ng/ml/cc
Low Risk	PSA <10 ng/ml AND Grade Group 1 AND clinical stage T1-T2a
Intermediate Risk	PSA 10-<20 ng/ml OR Grade Group 2-3 OR clinical stage T2b-c <ul style="list-style-type: none"> • Favorable: Grade Group 1 (with PSA 10-<20) OR Grade Group 2 (with PSA <10) • Unfavorable: Grade Group 2 (with either PSA 10-<20 or clinical stage T2b-c) OR Grade Group 3 (with PSA < 20)
High Risk	PSA ≥20 ng/ml OR Grade Group 4-5 OR clinical stage ≥T3*

*Clinical stage T3 cancer is considered locally advanced and, therefore, outside the scope of this guideline.

Guideline Statements

Shared Decision Making (SDM)

- Counseling of patients to select a management strategy for localized prostate cancer should incorporate shared decision making and explicitly consider cancer severity (risk category), patient values and preferences, life expectancy, pre-treatment general functional and genitourinary symptoms, expected post-treatment functional status, and potential for salvage treatment. (*Strong Recommendation; Evidence Level: Grade A*)

- Prostate cancer patients should be counseled regarding the importance of modifiable health-related behaviors or risk factors, such as smoking and obesity. (*Expert Opinion*)
- Clinicians should encourage patients to meet with different prostate cancer care specialists (e.g., urology and either radiation oncology or medical oncology or both), when possible to promote informed decision making. (*Moderate Recommendation; Evidence Level: Grade B*)
- Effective shared decision making in prostate cancer care requires clinicians to inform patients about immediate and long-term morbidity or side effects of proposed treatment or care options. (*Clinical Principle*)
- Clinicians should inform patients about suitable clinical trials and encourage patients to consider participation in such trials based on eligibility and access. (*Expert Opinion*)

Care Options by Cancer Severity/Risk Group

Very Low-/Low-Risk Disease

- Clinicians should not perform abdomino-pelvic CT or routine bone scans in the staging of asymptomatic very low- or low-risk localized prostate cancer patients. (*Strong Recommendation; Evidence Level: Grade C*)
- Clinicians should recommend active surveillance as the best available care option for very low-risk localized prostate cancer patients. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should recommend active surveillance as the preferable care option for most low-risk localized prostate cancer patients. (*Moderate Recommendation; Evidence Level: Grade B*)

- Clinicians may offer definitive treatment (i.e. radical prostatectomy or radiotherapy) to select low-risk localized prostate cancer patients who may have a high probability of progression on active surveillance. *(Conditional Recommendation; Evidence Level: Grade B)*
- Clinicians should not add androgen deprivation therapy (ADT) along with radiotherapy for low-risk localized prostate cancer with the exception of reducing the size of the prostate for brachytherapy. *(Strong Recommendation; Evidence Level: Grade B)*
- Clinicians should inform low-risk prostate cancer patients considering whole gland cryosurgery that consequent side effects are considerable and survival benefit has not been shown in comparison to active surveillance. *(Conditional Recommendation; Evidence Level: Grade C)*
- Clinicians should inform low-risk prostate cancer patients who are considering focal therapy or high intensity focused ultrasound (HIFU) that these interventions are not standard care options because comparative outcome evidence is lacking. *(Expert Opinion)*
- Clinicians should recommend observation or watchful waiting for men with a life expectancy ≤ 5 years with low-risk localized prostate cancer. *(Strong Recommendation; Evidence Level: Grade B)*
- Among most low-risk localized prostate cancer patients, tissue based genomic biomarkers have not shown a clear role in the selection of candidates for active surveillance. *(Expert Opinion)*

Intermediate-Risk Disease

- Clinicians should consider staging unfavorable intermediate-risk localized prostate cancer patients with cross sectional imaging (CT or MRI) and bone scan. *(Expert Opinion)*
- Clinicians should recommend radical prostatectomy or radiotherapy plus ADT as standard treatment options for patients with intermediate-risk localized prostate cancer. *(Strong Recommendation; Evidence Level: Grade A)*
- Clinicians should inform patients that favorable intermediate-risk prostate cancer can be treated with radiation alone, but that the evidence basis is less robust than for combining radiotherapy with ADT. *(Moderate Recommendation; Evidence Level: Grade B)*
- In select patients with intermediate-risk localized prostate cancer, clinicians may consider other treatment options such as cryosurgery. *(Conditional Recommendation; Evidence Level: Grade C)*
- Active surveillance may be offered to select patients with favorable intermediate-risk localized prostate cancer; however, patients should be informed that this comes with a higher risk of developing metastases compared to definitive treatment. *(Conditional Recommendation; Evidence Level: Grade C)*
- Clinicians should recommend observation or watchful waiting for men with a life expectancy ≤ 5 years with intermediate-risk localized prostate cancer. *(Strong Recommendation; Evidence Level: Grade A)*
- Clinicians should inform intermediate-risk prostate cancer patients who are considering focal therapy or HIFU

that these interventions are not standard care options because comparative outcome evidence is lacking. (*Expert Opinion*)

High-Risk Disease

- Clinicians should stage high-risk localized prostate cancer patients with cross sectional imaging (CT or MRI) and bone scan. (*Clinical Principle*)
- Clinicians should recommend radical prostatectomy or radiotherapy plus ADT as standard treatment options for patients with high-risk localized prostate cancer. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should not recommend active surveillance for patients with high-risk localized prostate cancer. Watchful waiting should only be considered in asymptomatic men with limited life expectancy ≤ 5 years). (*Moderate Recommendation; Evidence Level: Grade C*)
- Cryosurgery, focal therapy and HIFU treatments are not recommended for men with high-risk localized prostate cancer outside of a clinical trial. (*Expert Opinion*)
- Clinicians should not recommend primary ADT for patients with high-risk localized prostate cancer unless the patient has both limited life expectancy and local symptoms. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians may consider referral for genetic counseling for patients (and their families) with high-risk localized prostate cancer and a strong family history of specific cancers (e.g., breast, ovarian, pancreatic, other gastrointestinal tumors, lymphoma). (*Expert Opinion*)

Recommended Approaches and Details of Specific Care Options.

Active Surveillance

- Localized prostate cancer patients who elect active surveillance should have accurate disease staging including systematic biopsy with ultrasound or MRI-guided imaging. (*Clinical Principle*)
- Localized prostate cancer patients undergoing active surveillance should have routine surveillance PSA testing and digital rectal exams. (*Strong Recommendation; Evidence Level: Grade B*)
- Localized prostate cancer patients undergoing active surveillance should be encouraged to have a confirmatory biopsy within the initial two years and surveillance biopsies thereafter. (*Clinical Principle*)
- Clinicians may consider multiparametric prostate MRI as a component of active surveillance for localized prostate cancer patients. (*Expert Opinion*)
- Tissue based genomic biomarkers have not shown a clear role in active surveillance for localized prostate cancer and are not necessary for follow up. (*Expert Opinion*)
- Clinicians should offer definitive treatment to localized prostate cancer patients undergoing active surveillance who develop adverse reclassification. (*Moderate Recommendation; Evidence Level: Grade B*)

Prostatectomy

- Clinicians should inform localized prostate cancer patients that younger or healthier men (e.g., <65 years of age or >10 year life expectancy) are more likely to

experience cancer control benefits from prostatectomy than older men. (*Strong Recommendation; Evidence Level: Grade B*)

- Clinicians should inform localized prostate cancer patients that open and robot-assisted radical prostatectomy offer similar cancer control, continence recovery, and sexual recovery outcomes. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should inform localized prostate cancer patients that robotic/laparoscopic or perineal techniques are associated with less blood loss than retropubic prostatectomy. (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should counsel localized prostate cancer patients that nerve-sparing is associated with better erectile function recovery than non-nerve sparing. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should not treat localized prostate cancer patients who have elected to undergo radical prostatectomy with neoadjuvant ADT or other systemic therapy outside of clinical trials. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should inform localized prostate cancer patients considering prostatectomy that older men experience higher rates of permanent erectile dysfunction and urinary incontinence after prostatectomy compared to younger men. (*Strong Recommendation; Evidence Level: Grade B*)
- Pelvic lymphadenectomy can be considered for any localized prostate cancer patients undergoing radical

prostatectomy and is recommended for those with unfavorable intermediate-risk or high-risk disease. Patients should be counseled regarding the common complications of lymphadenectomy, including lymphocele development and its treatment. (*Expert Opinion*)

- Clinicians should inform localized prostate cancer patients with unfavorable intermediate-risk or high-risk prostate cancer about benefits and risks related to the potential option of adjuvant radiotherapy when locally extensive prostate cancer is found at prostatectomy. (*Moderate Recommendation; Evidence Level: Grade B*)

Radiotherapy

- Clinicians may offer single modality external beam radiotherapy or brachytherapy for patients who elect radiotherapy for low-risk localized prostate cancer. (*Clinical Principle*)
- Clinicians may offer external beam radiotherapy or brachytherapy alone or in combination for favorable intermediate-risk localized prostate cancer. (*Clinical Principle*)
- Clinicians should offer 24-36 months of ADT as an adjunct to either external beam radiotherapy alone or external beam radiotherapy combined with brachytherapy to patients electing radiotherapy for high-risk localized prostate cancer. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should inform localized prostate cancer patients that use of ADT with radiation increases the likelihood and severity of adverse treatment-related

events on sexual function in most men and can cause other systemic side effects. (*Strong Recommendation; Evidence Level: Grade B*)

- Clinicians should consider moderate hypofractionation when the localized prostate cancer patient (of any risk category) and clinician decide on external beam radiotherapy to the prostate (without nodal radiotherapy). (*Moderate Recommendation; Evidence Level: Grade B*)
- For localized prostate cancer patients with obstructive, non-cancer-related lower urinary function, surgical approaches may be preferred. If radiotherapy is used for these patients or those with previous significant transurethral resection of the prostate, low-dose rate brachytherapy should be discouraged. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should inform localized prostate cancer patients who are considering proton beam therapy that it offers no clinical advantage over other forms of definitive treatment. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should inform localized prostate cancer patients considering brachytherapy that it has similar effects as external beam radiotherapy with regard to erectile dysfunction and proctitis but can also exacerbate urinary obstructive symptoms. (*Expert Opinion*)

Whole Gland Cryosurgery

- Clinicians may consider whole gland cryosurgery in low- and intermediate-risk localized prostate cancer patients who are not suitable for either radical prostatectomy or radiotherapy due to comorbidities yet have >10 year life expectancy. (*Expert Opinion*)

- Clinicians should inform localized prostate cancer patients considering whole gland cryosurgery that cryosurgery has similar progression-free survival as did non-dose escalated external beam radiation (also given with neoadjuvant hormonal therapy) in low- and intermediate-risk disease, but conclusive comparison of cancer mortality is lacking. (*Conditional Recommendation; Evidence Level: Grade C*)
- Defects from prior transurethral resection of the prostate are a relative contraindication for whole gland cryosurgery due to the increased risk of urethral sloughing. (*Clinical Principle*)
- For whole gland cryosurgery treatment, clinicians should utilize a third or higher generation, argon-based cryosurgical system. (*Clinical Principle*)
- Clinicians should inform localized prostate cancer patients considering cryosurgery that it is unclear whether or not concurrent ADT improves cancer control, though it can reduce prostate size to facilitate treatment. (*Clinical Principle*)
- Clinicians should inform localized prostate cancer patients considering whole gland cryosurgery that erectile dysfunction is an expected outcome. (*Clinical Principle*)
- Clinicians should inform localized prostate cancer patients considering whole gland cryosurgery about the adverse events of urinary incontinence, irritative and obstructive urinary problems. (*Strong Recommendation; Evidence Level: Grade B*)

HIFU and Focal Therapy

- Clinicians should inform those localized prostate cancer patients considering focal therapy or HIFU that these treatment options lack robust evidence of efficacy. (*Expert Opinion*)
- Clinicians should inform localized prostate cancer patients who are considering HIFU that even though HIFU is approved by the FDA for the destruction of prostate tissue, it is not approved explicitly for the treatment of prostate cancer. (*Expert Opinion*)
- Clinicians should advise localized prostate cancer patients considering HIFU that tumor location may influence oncologic outcome. Limiting apical treatment to minimize morbidity increases the risk of cancer persistence. (*Moderate Recommendation; Evidence Level: Grade C*)
- As prostate cancer is often multifocal, clinicians should inform localized prostate cancer patients considering focal therapy that focal therapy may not be curative and that further treatment for prostate cancer may be necessary. (*Expert Opinion*)

Outcome Expectations and Management

Treatment Side Effects and Health Related Quality of Life

- Clinicians should inform localized prostate cancer patients that erectile dysfunction occurs in many patients following prostatectomy or radiation, and that ejaculate will be lacking despite preserved ability to attain orgasm, whereas observation does not cause such sexual dysfunction. (*Strong Recommendation; Evidence Level: Grade B*)

- Clinicians should inform localized prostate cancer patients that long-term obstructive or irritative urinary problems occur in a subset of patients following observation or active surveillance or following radiation, whereas prostatectomy can relieve pre-existing urinary obstruction. (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should inform localized prostate cancer patients that whole-gland cryosurgery is associated with worse sexual side effects and similar urinary and bowel/rectal side effects as those after radiotherapy. (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should inform localized prostate cancer patients that temporary urinary incontinence occurs in most patients after prostatectomy and persists long-term in a small but significant subset, more than during observation or active surveillance or after radiation. (*Strong Recommendation; Evidence Level: Grade A*)
- Clinicians should inform localized prostate cancer patients that temporary proctitis following radiation persists in some patients long-term in a small but significant subset and is rare during observation or active surveillance or after prostatectomy. (*Strong Recommendation; Evidence Level: Grade A*)

Post-Treatment Follow Up

- Clinicians should monitor localized prostate cancer patients post therapy with PSA, even though not all PSA recurrences are associated with metastatic disease and prostate cancer specific death. (*Clinical Principle*)

- Clinicians should inform localized prostate cancer patients of their individualized risk-based estimates of post-treatment prostate cancer recurrence. (*Clinical Principle*)
- Clinicians should support localized prostate cancer patients who have survivorship or outcomes concerns by facilitating symptom management and encouraging engagement with professional or community-based resources. (*Clinical Principle*)

TABLE 2.

Care Options for Localized Prostate Cancer by Level of Evidence and Strength of Recommendation

Evidence Level/ Recommendation Strength	Prostate Cancer Severity/Aggressiveness				
	Low Risk		Intermediate Risk		High Risk
	<i>Very Low Risk</i>	<i>Low Risk</i>	<i>Favorable</i>	<i>Unfavorable</i>	
A / Strong	Active Surveillance	NA	Radical Prostatectomy OR Radiotherapy with Androgen Deprivation Therapy	Radical Prostatectomy OR Radiotherapy with Androgen Deprivation Therapy	Radical Prostatectomy OR Radiotherapy with Androgen Deprivation Therapy
B / Moderate	NA	Active Surveillance	Radiotherapy without Androgen Deprivation Therapy	NA	NA
B / Conditional	NA	Radical Prostatectomy OR Radiotherapy	NA	NA	NA
C / Conditional	NA	Cryosurgery (whole gland)	Active Surveillance OR Cryosurgery (whole gland)	Cryosurgery (whole gland)	NA
No evidence/ Clinical principle or expert opinion	NA	Focal Ablative Therapy OR High Intensity Focused Ultrasound	Focal Ablative Therapy OR High Intensity Focused Ultrasound	Focal Ablative Therapy OR High Intensity Focused Ultrasound	NA

Multicenter randomized clinical trials that constitute the basis for evidence:

EORTC-Bolla (XRT+ADT vs XRT): Evidence supporting XRT+ADT (intermediate-risk, high-risk)

SPCG4 (RP vs WW): Evidence supporting RP (intermediate-risk, high-risk)

RTOG 9408 (XRT+ADT vs XRT): Evidence supporting XRT+ADT (intermediate risk)

PIVOT (RP vs WW): Evidence supporting AS (very low-risk, low-risk); RP (intermediate-risk, high-risk)

EORTC (Widmark XRT+ADT vs ADT alone): Evidence supporting XRT+ADT (intermediate-risk, high-risk)

PROTECT (AS vs RP vs XRT+ADT): Evidence supporting AS (very low-risk, low-risk, favorable intermediate-risk); RP or XRT+ADT (low-risk, favorable intermediate-risk)

Single-center RCT: Donnelly et al. (Cryo+ADT vs XRT+ADT): Evidence supporting whole gland cryotherapy (low-risk, intermediate-risk)

ADJUVANT AND SALVAGE RADIOTHERAPY AFTER PROSTATECTOMY

ASTRO/AUA Guideline (2013)

Purpose

The purpose of this guideline is to provide a clinical framework for the use of radiotherapy after prostatectomy in patients with and without evidence of prostate cancer recurrence.

Definitions

- Adjuvant radiotherapy (ART) is defined as the administration of RT to post-prostatectomy patients at a higher risk of recurrence because of adverse pathological features prior to evidence of disease recurrence (i.e., with an undetectable PSA).
- Salvage radiotherapy (SRT) is defined as the administration of RT to the prostatic bed and possibly to the surrounding tissues, including lymph nodes, in the patient with a PSA recurrence after surgery but no evidence of distant metastatic disease.
- Biochemical (PSA) recurrence after surgery is defined as a detectable PSA level ≥ 0.2 ng/mL with a second confirmatory level ≥ 0.2 ng/mL.

Guideline Statements

- Patients who are being considered for management of localized prostate cancer with radical prostatectomy should be informed of the potential for adverse pathologic findings that portend a higher risk of cancer recurrence and that these findings may suggest a potential benefit of additional therapy after surgery.
- Patients with adverse pathologic findings including seminal vesicle invasion, positive surgical margins, and extraprostatic extension should be informed that adjuvant radiotherapy, compared to radical prostatectomy only, reduces the risk of biochemical (PSA) recurrence, local recurrence, and clinical progression of cancer. They should also be informed that the impact of adjuvant radiotherapy on subsequent metastases and overall survival is less clear; one of two randomized controlled trials that addressed these outcomes indicated a benefit but the other trial did not demonstrate a benefit. However, the other trial was not powered to test the benefit regarding metastases and overall survival.
- Physicians should offer adjuvant radiotherapy to patients with adverse pathologic findings at prostatectomy including seminal vesicle invasion, positive surgical margins, or extraprostatic extension because of demonstrated reductions in biochemical recurrence, local recurrence, and clinical progression.
- Patients should be informed that the development of a PSA recurrence after surgery is associated with a higher risk of development of metastatic prostate cancer or death from the disease. Congruent with this clinical principle, physicians should regularly monitor PSA after radical

prostatectomy to enable early administration of salvage therapies if appropriate.

- Clinicians should define biochemical recurrence as a detectable or rising PSA value after surgery that is ≥ 0.2 ng/ml with a second confirmatory level ≥ 0.2 ng/ml.
- A restaging evaluation in the patient with a PSA recurrence may be considered.
- Physicians should offer salvage radiotherapy to patients with PSA or local recurrence after radical prostatectomy in whom there is no evidence of distant metastatic disease.
- Patients should be informed that the effectiveness of radiotherapy for PSA recurrence is greatest when given at lower levels of PSA.
- Patients should be informed of the possible short-term and long-term urinary, bowel, and sexual side effects of radiotherapy as well as of the potential benefits of controlling disease recurrence.

PSA TESTING FOR THE PRETREATMENT STAGING AND POSTTREATMENT MANAGEMENT OF PROSTATE CANCER

2013 Revision of 2009 Best Practice Statement Explanation of Revised Document

This revised document contains the content of the "Prostate-Specific Antigen Best Practice Statement: 2009 Update" deleting that which pertains to the detection of prostate cancer. An updated guideline, available on the auanet.org website, is the 2013 AUA document "Early Detection of Prostate Cancer: AUA Guideline." Statements related to the detection of prostate cancer have been deleted, such that this revised document addresses only the use of PSA testing for the pretreatment staging and posttreatment management of prostate cancer. No other major changes have been made.

Use of PSA for Pre-treatment Staging Risk Stratification and Prognosis

PSA level and rate of rising are linked to the extent and biological potential of prostate cancer. The proportion of men with higher volume cancers, extraprostatic disease, higher-grade disease, and biochemical failure after treatment all increase as the PSA level increases. **Routine radiographic staging, such as with bone scan, computed tomography (CT), or magnetic resonance imaging (MRI), or surgical staging with pelvic lymph node dissection are**

not necessary in all cases of newly diagnosed prostate cancer. Clinical examination can determine appropriate patients for such staging.

- ◆ Proportion of men with pathologically organ-confined disease is about 80% when the PSA level at diagnosis is <4.0 ng/ml; about 70% when the PSA level is between 4.0 and 10.0 ng/ml; and about 50% when the PSA level is >10.0 ng/ml. The proportion of men with metastases to the pelvic lymph nodes is around 5% when the PSA level at diagnosis is 10.0 ng/ml or less, 18% when the PSA level is between 10.0 and 20.0 ng/ml, and 36% when the PSA level is above 20.0 ng/ml.
- ◆ The integration of clinical stage, histologic tumor grade, and PSA level may further refine the ability to predict outcomes after treatment for prostate cancer.
- ◆ Nomograms incorporating pretreatment PSA may help to calculate the probability of clinical endpoints and outcomes of treatment.
- ◆ Men with a PSAV above 2.0 ng/ml/year may have an approximate 10-fold greater risk of death from prostate cancer in the decade after radical prostatectomy than men with a PSAV of 2.0 ng/ml/year or less in the year before diagnosis.

Radiographic Considerations

- ◆ Bone scan:
 - not required for staging asymptomatic men with clinically localized prostate cancer when their PSA is <20.0 ng/ml unless history or clinical examination suggests bony involvement.
 - consider with Gleason 8 or greater disease, or stage \geq T3 prostate cancer, even if the PSA is <10.0 ng/ml.

◆ CT or MRI scans:

- for staging high-risk clinically localized prostate cancer when PSA is greater than 20.0 ng/ml, with locally advanced cancer or with a Gleason score greater than or equal to 8
- CT scan identification of pelvic adenopathy depends upon lymph node enlargement, and the correlation between nodal size and metastatic involvement is poor.
 - ◆ Pelvic lymph node dissection:
- may not be necessary for clinically localized prostate cancer if PSA is less than 10.0 ng/ml and the Gleason score is less than or equal to 6.
- lymphadenectomy is not needed in low-risk patients. Patients with higher risk disease may benefit from lymphadenectomy. However, careful patient selection and risk/benefit analysis are crucial due to the potential for morbidity.

The Use of PSA in the Post-treatment Management of Prostate Cancer

- Offer periodic PSA determinations to detect disease recurrence

Post-Prostatectomy:

PSA levels post-radical prostatectomy should decrease and remain undetectable. Detectable levels indicate disease recurrence in some patients but also may be due to presence of benign glands. Biochemical recurrence (according to AUA) is an initial PSA value \geq 0.2 ng/ml followed by a subsequent confirmatory PSA value \geq 0.2 ng/ml.

- PSA level is significantly associated with the risk of biochemical failure after surgical treatment of prostate cancer; for each 2-point increase in PSA level, the risk of biochemical progression increases by approximately 2-fold.
- Biochemical recurrence of cancer is evident within 10 years of surgery in approximately 10% of men with a preoperative PSA level below 2.6 ng/ml, 20% when the PSA level is between 2.6 and 10.0 ng/ml, and 50% when the PSA level is above 10.0 ng/ml.
- A cut-point of 0.4 ng/ml followed by another increase may better predict risk of metastatic relapse. (This cut-point was selected as a means of reporting outcomes, rather than a threshold for initiation of treatment.)

Post-Radiation:

PSA levels should fall to a low level and remain stable. PSA values <0.2 are uncommon after external beam radiotherapy, which does not ablate all prostate tissue. Consistently rising PSA levels often indicate cancer recurrence.

- ✦ The change in PSA following interstitial prostate brachytherapy is complex and characterized by intermittent rises called "benign bounces." The median PSA level of these patients is <0.1 ng/ml.
- ✦ The number of rises needed to define a failure is under debate: any rise in PSA level of 2.0 ng/ml or more, over and above the nadir, predicts failure after both external beam radiotherapy and interstitial prostate brachytherapy, irrespective of androgen deprivation.
- ✦ The time of failure should not be backdated to the first rise in PSA. Although a "target PSA" was not possible after external beam radiotherapy, a PSA level of <0.7 ng/

ml at five years is reasonable for brachytherapy. PSA levels continue to decline more than five years after interstitial prostate brachytherapy.

PSA nadir after androgen suppression:

- ✦ PSA kinetics correlated with outcomes. In patients with metastatic disease receiving androgen suppression therapy, failure to achieve a PSA nadir of <4.0 ng/ml seven months after initiation of therapy is associated with median survival of one year.
- ✦ Patients with a PSA nadir of <0.2 ng/ml have a median survival of six+ years.
- ✦ For patients with a PSA rise following radical prostatectomy or radiation and no radiologic evidence of metastases, a PSA nadir of >0.2 ng/ml within eight months of androgen suppression is associated with a 20-fold greater risk of prostate cancer-specific mortality as compared to patients with a PSA nadir of <0.2 ng/ml.
- ✦ PSA nadir of >0.2 ng/ml in the setting of a PSADT of <3 months is ominous.
- ✦ The prognostic importance of the value of the PSA nadir after androgen deprivation therapy is clear. Careful PSA monitoring after the initiation of such therapy can effectively identify those patients with a poor prognosis.

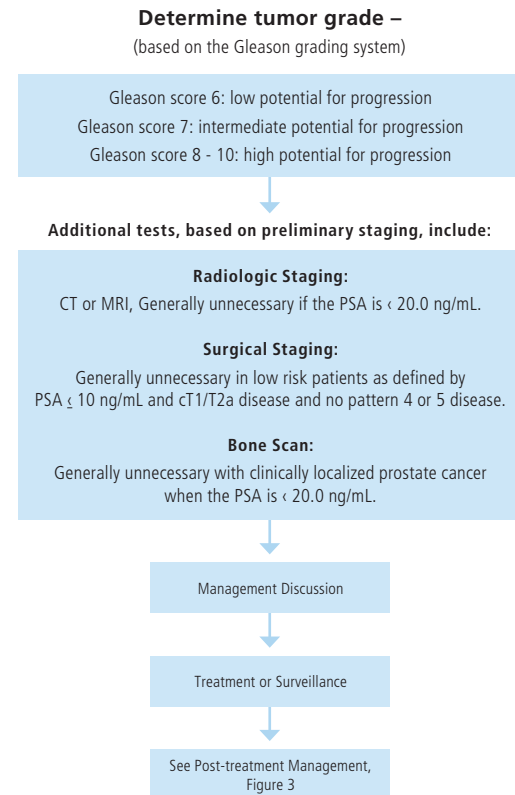
PSA kinetics and salvage therapy

- Problematic to distinguish local from distant recurrence after local treatments:
 - ✦ Most patients with a PSA rise have a negative physical exam and non-informative imaging tests.
 - ✦ When PSA is low (i.e., 0.5 to 1.5 ng/ml) even patients with multiple adverse risk factors may respond to salvage radiation after prostatectomy, especially those with positive surgical margins.

- ◆ Strongly consider salvage radiation given that it is the only potentially curative treatment in this setting.
- Predictors of favorable response to post-radiation salvage prostatectomy are less well defined compared with those for salvage radiation following radical prostatectomy.
 - ◆ Recurrent disease noted on prostate biopsy, PSA less than 10.0 ng/ml (preferably PSA less than 5.0 ng/ml), a clinically localized cancer (i.e. T1C or T2), and no evidence of metastases on prior evaluation or pre-operative imaging are reasonable criteria.
 - ◆ Patients with a long PSADT (>15 months) have a low likelihood of prostate cancer-specific mortality over a 10 year period
 - ◆ Active surveillance may be considered for those with a life expectancy of <10 years. In contrast, patients with a PSADT <3 months have a median overall survival of 6 years following PSA failure, and are likely have distant disease.
 - ◆ Patients experiencing a relapse after local therapy may be candidates for clinical trials.

FIGURE 2.

Staging—Once Prostate Cancer is Diagnosed

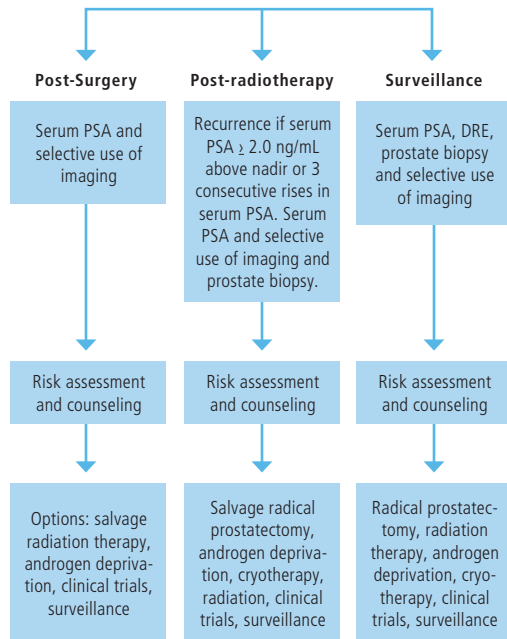


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FIGURE 3.

Posttreatment Assessment and Management

Goal: Monitor recurrence and treat as necessary



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RENAL MASS AND LOCALIZED RENAL CANCER

AUA Guideline (2017)

Purpose

This AUA Guidelines focuses primarily on the evaluation and management of clinically localized sporadic renal masses suspicious for renal cell carcinoma (RCC) in adults, including solid enhancing renal tumors and Bosniak 3 and 4 complex cystic renal masses. Some patients with clinically localized renal masses may present with findings suggesting aggressive tumor biology or may be upstaged on exploration or final pathology. Management considerations pertinent to the urologist in such patients will also be addressed. Practice patterns regarding such tumors vary considerably. The literature regarding evaluation and management has been rapidly evolving. Notable examples include controversies about the role of renal mass biopsy and concerns about overutilization of radical nephrectomy. Please also refer to the associated Renal Mass and Localized Renal Cancer treatment algorithm.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: Strong Recommendations and Moderate Recommendations are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a Conditional Recommendation is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: Expert Opinions are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a Clinical Principle is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Evaluation and Diagnosis

- In patients with a solid or complex cystic renal mass, physicians should obtain high quality, multiphase, cross-sectional abdominal imaging to optimally characterize and clinically stage the renal mass. Characterization of the renal mass should include assessment of tumor complexity, degree of contrast enhancement (where applicable), and presence or absence of fat. *(Clinical Principle)*
- In patients with suspected renal malignancy, physicians should obtain comprehensive metabolic panel, complete blood count, and urinalysis. Metastatic evaluation should include chest imaging to evaluate for possible thoracic metastases. *(Clinical Principle)*
- For patients with a solid or complex cystic renal mass, physicians should assign CKD stage based on GFR and degree of proteinuria. *(Expert Opinion)*

Counseling

- In patients with a solid or Bosniak 3/4 complex cystic renal mass, a urologist should lead the counseling process and should consider all management strategies. A multidisciplinary team should be included when necessary. *(Expert Opinion)*

- Physicians should provide counseling that includes current perspectives about tumor biology and a patient-specific risk assessment inclusive of sex, tumor size/complexity, histology (when obtained), and imaging characteristics. For cT1a tumors, the low oncologic risk of many small renal masses should be reviewed. *(Clinical Principle)*
- During counseling of patients with a solid or Bosniak 3/4 complex cystic renal mass, physicians must review the most common and serious urologic and non-urologic morbidities of each treatment pathway and the importance of patient age, comorbidities/frailty, and life expectancy. *(Clinical Principle)*
- Physicians should review the importance of renal functional recovery related to renal mass management, including the risk of progressive CKD, potential short- or long-term need for renal replacement therapy, and long-term overall survival considerations. *(Clinical Principle)*
- Physicians should consider referral to nephrology in patients with a high risk of CKD progression. Such patients may include those with eGFR less than 45 ml/min/1.73m², confirmed proteinuria, diabetics with preexisting CKD, or whenever eGFR is expected to be less than 30 ml/min/1.73m² after intervention. *(Expert Opinion)*
- Physicians should recommend genetic counseling for all patients ≤ 46 years of age with renal malignancy and consider genetic counseling for patients with multifocal or bilateral renal masses, or if personal or family history suggests a familial renal neoplastic syndrome. *(Expert Opinion)*

Renal Mass Biopsy (RMB)

- Renal mass biopsy should be considered when a mass is suspected to be hematologic, metastatic, inflammatory, or infectious. (*Clinical Principle*)
- In the setting of a solid renal mass, RMB is not required for young or healthy patients who are not willing to accept the uncertainties associated with RMB or for older or frail patients who will be managed conservatively independent of RMB findings. (*Expert Opinion*)
- When considering the utility of RMB, patients should be counseled regarding rationale, positive and negative predictive values, potential risks and non-diagnostic rates of RMB. (*Clinical Principle*)
- For patients with a solid renal mass who elect RMB, multiple core biopsies are preferred over fine needle aspiration. (*Moderate Recommendation; Evidence Level: Grade C*)

Management

Partial Nephrectomy (PN) and Nephron-Sparing Approaches

- Physicians should prioritize PN for the management of the cT1a renal mass when intervention is indicated. In this setting, PN minimizes risk of CKD or CKD progression and is associated with favorable oncologic outcomes, including excellent local control. (*Moderate Recommendation; Evidence Level: Grade B*)
- Physicians should prioritize nephron-sparing approaches for patients with solid or Bosniak 3/4 complex cystic renal masses and an anatomic or functionally solitary kidney, bilateral tumors, known familial RCC, preexisting CKD, or proteinuria. (*Moderate Recommendation; Evidence Level: Grade C*)

- Physicians should consider nephron-sparing approaches for patients with solid or Bosniak 3/4 complex cystic renal masses who are young, have multifocal masses, or comorbidities that are likely to impact renal function in the future, such as moderate to severe hypertension, diabetes mellitus, recurrent urolithiasis, or morbid obesity. (*Conditional Recommendation; Evidence Level: Grade C*)
- In patients who elect PN, physicians should prioritize preservation of renal function through efforts to optimize nephron mass preservation and avoidance of prolonged warm ischemia. (*Expert Opinion*)
- For patients undergoing PN, negative surgical margins should be a priority. The extent of normal parenchyma removed should be determined by surgeon discretion taking into account the clinical situation, tumor characteristics including growth pattern, and interface with normal tissue. Tumor enucleation should be considered in patients with familial RCC, multifocal disease, or severe CKD to optimize parenchymal mass preservation. (*Expert Opinion*)

Radical Nephrectomy (RN)

- Physicians should consider RN for patients with a solid or Bosniak 3/4 complex cystic renal mass where increased oncologic potential is suggested by tumor size, RMB, and/or imaging characteristics and in whom active treatment is planned. (*Conditional Recommendation; Evidence Level: Grade B*). In this setting, RN is preferred if all of the following criteria are met: 1) high tumor complexity and PN would be challenging even in experienced hands; 2) no preexisting CKD or proteinuria; and 3) normal contralateral kidney and new baseline eGFR will likely be greater than 45 ml/min/1.73m². (*Expert Opinion*)

Surgical Principles

- For patients who are undergoing surgical excision of a renal mass with clinically concerning regional lymphadenopathy, physicians should perform a lymph node dissection for staging purposes. (*Expert Opinion*)
- For patients who are undergoing surgical excision of a renal mass, physicians should perform adrenalectomy if imaging and/or intraoperative findings suggest metastasis or direct invasion of the adrenal gland. (*Clinical Principle*)
- In patients undergoing surgical excision of a renal mass, a minimally invasive approach should be considered when it would not compromise oncologic, functional, and perioperative outcomes. (*Expert Opinion*)
- Pathologic evaluation of the adjacent renal parenchyma should be performed after PN or RN to assess for possible intrinsic renal disease, particularly for patients with CKD or risk factors for developing CKD. (*Clinical Principle*)

Thermal Ablation (TA)

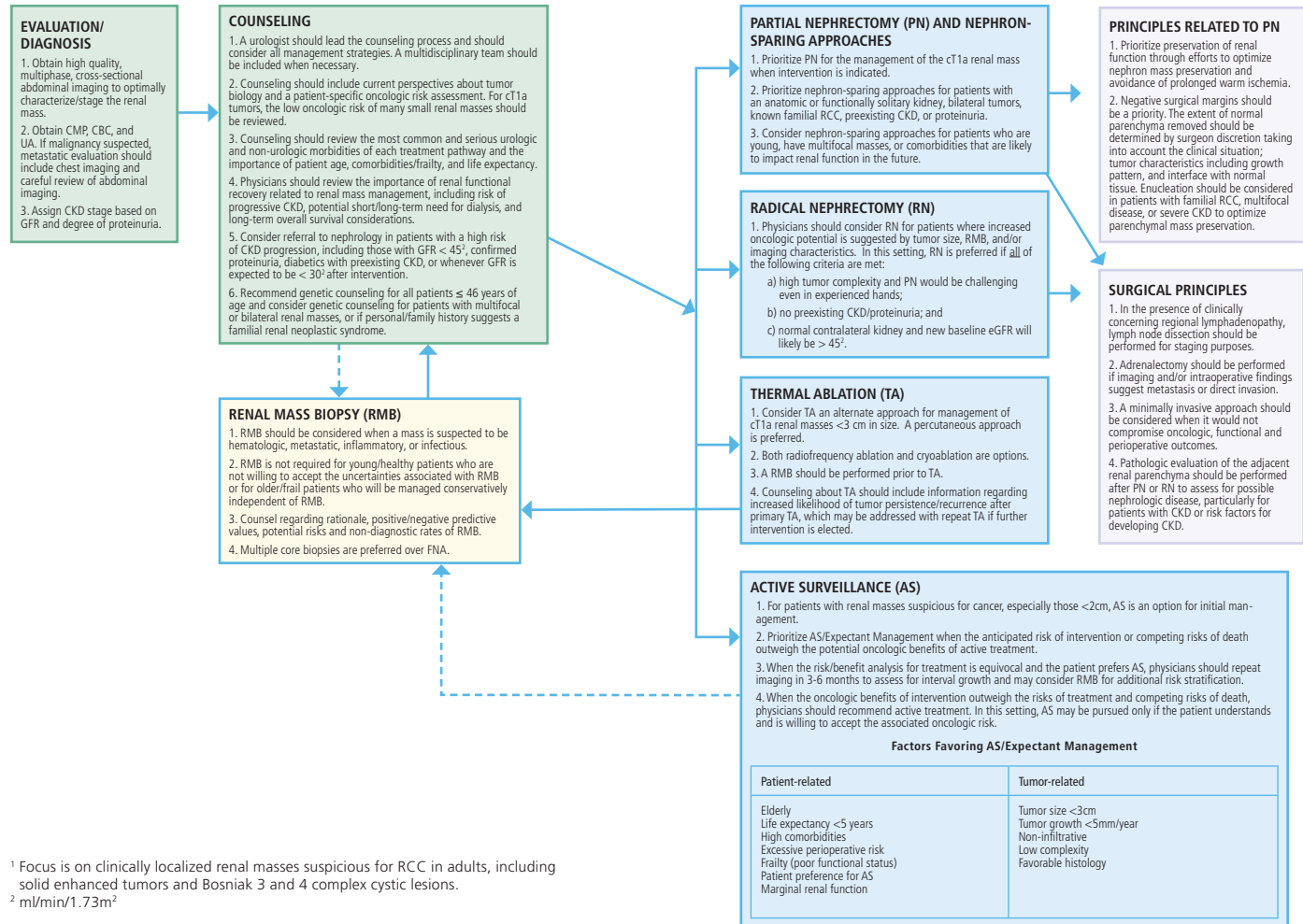
- Physicians should consider thermal ablation (TA) as an alternate approach for the management of cT1a renal masses <3 cm in size. For patients who elect TA, a percutaneous technique is preferred over a surgical approach whenever feasible to minimize morbidity. (*Conditional Recommendation; Evidence Level: Grade C*)
- Both radiofrequency ablation and cryoablation are options for patients who elect thermal ablation. (*Conditional Recommendation; Evidence Level: Grade C*)
- A renal mass biopsy should be performed prior to ablation to provide pathologic diagnosis and guide subsequent surveillance. (*Expert Opinion*)

- Counseling about thermal ablation should include information regarding an increased likelihood of tumor persistence or local recurrence after primary thermal ablation relative to surgical extirpation, which may be addressed with repeat ablation if further intervention is elected. (*Strong Recommendation; Evidence Level: Grade B*)

Active Surveillance (AS)

- For patients with small solid or Bosniak 3/4 complex cystic renal masses, especially those <2cm, AS is an option for initial management. (*Conditional Recommendation; Evidence Level: Grade C*)
- For patients with a solid or Bosniak 3/4 complex cystic renal mass, physicians should prioritize active surveillance/expectant management when the anticipated risk of intervention or competing risks of death outweigh the potential oncologic benefits of active treatment. (*Clinical Principle*)
- For patients with a solid or Bosniak 3/4 complex cystic renal mass in whom the risk/benefit analysis for treatment is equivocal and who prefer AS, physicians should repeat imaging in 3-6 months to assess for interval growth and may consider RMB for additional risk stratification. (*Expert Opinion*)
- For patients with a solid or Bosniak 3/4 complex cystic renal mass in whom the anticipated oncologic benefits of intervention outweigh the risks of treatment and competing risks of death, physicians should recommend active treatment. In this setting, AS with potential for delayed intervention may be pursued only if the patient understands and is willing to accept the associated oncologic risk. (*Moderate Recommendation; Evidence Level: Grade C*)

Renal Mass and Localized Renal Cancer¹

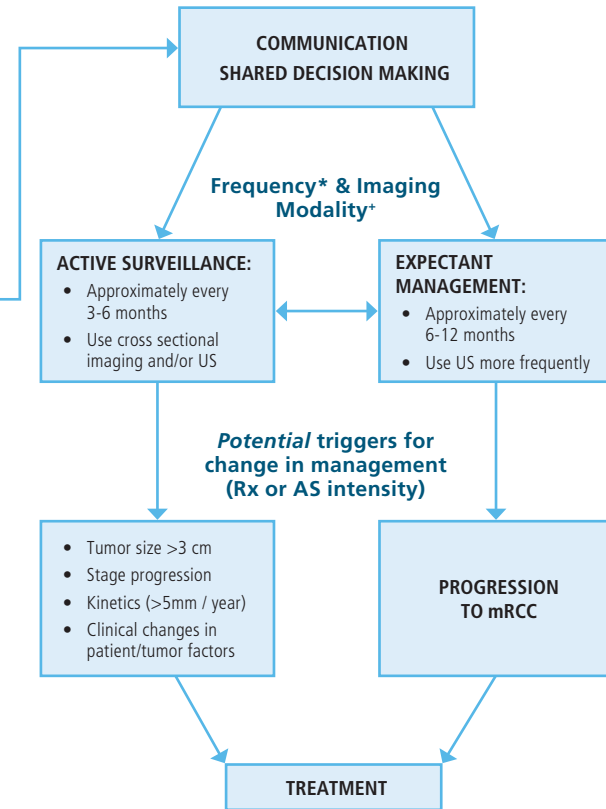
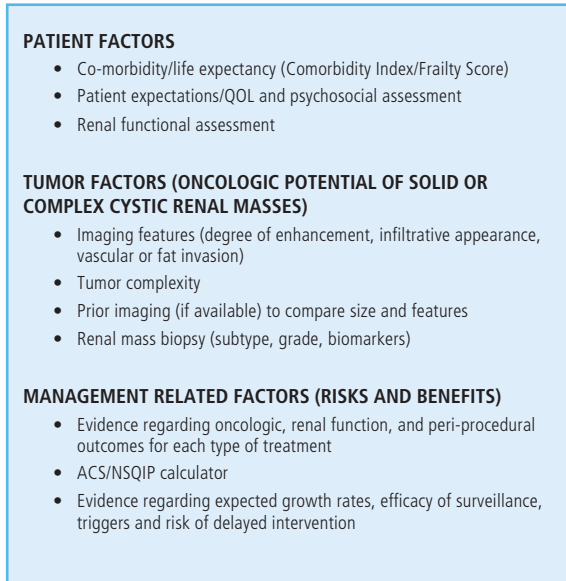


¹ Focus is on clinically localized renal masses suspicious for RCC in adults, including solid enhanced tumors and Bosniak 3 and 4 complex cystic lesions.

² ml/min/1.73m²

Algorithm for active surveillance or expectant management of localized renal masses suspicious for malignancy

Baseline Assessment



* Consider concurrent renal functional assessment (sCr, proteinuria), metabolic assessment (LFTs) and chest imaging

* Consider alternatives to contrast when possible or necessary (doppler, diffusion weighted images etc.)

MEDICAL MANAGEMENT OF KIDNEY STONES

(2014)

Purpose

Kidney stone disease is a common malady, affecting nearly 1 in 11 individuals in the United States at some point in their lives, and there is evidence that the number of those who have had a stone is rising. Unlike appendicitis and other surgical conditions, surgical treatment of stones is not the endpoint of the disease process, as stones are likely to recur, with at least 50% of individuals experiencing another stone within 10 years of the first occurrence. For those who have experienced a stone or undergone surgical intervention for a stone, there is strong motivation to avoid a repeat episode. Consequently, these patients often seek advice from a variety of practitioners on how to prevent recurrent stones. However, misinformation abounds in the lay community and on the internet, and even medical providers often promulgate recommendations that are contrary to evidence-based medicine. This Guideline is aimed at practitioners from a variety of disciplines who are confronted with patients afflicted with stone disease, and it is based on a systematic review of the literature with respect to the evaluation, treatment and follow-up of first-time and recurrent stone formers. Patient preferences and goals must be taken into account by the practitioner when considering these guidelines, as the cost, inconvenience and side effects of drugs and dietary measures to prevent stone disease must be weighed against the benefit of preventing a recurrent stone.

Evaluation

- A clinician should perform a screening evaluation consisting of a detailed medical and dietary history, serum chemistries and urinalysis on a patient newly diagnosed with kidney or ureteral stones.
- Clinicians should obtain serum intact parathyroid hormone (PTH) level as part of the screening evaluation if primary hyperparathyroidism is suspected.
- When a stone is available, clinicians should obtain a stone analysis at least once.
- Clinicians should obtain or review available imaging studies to quantify stone burden.
- Clinicians should perform additional metabolic testing in high-risk or interested first-time stone formers and recurrent stone formers.
- Metabolic testing should consist of one or two 24-hour urine collections obtained on a random diet and analyzed at minimum for total volume, pH, calcium, oxalate, uric acid, citrate, sodium, potassium and creatinine.
- Clinicians should not routinely perform “fast and calcium load” testing to distinguish among types of hypercalciuria.

Diet Therapies

- Clinicians should recommend to all stone formers a fluid intake that will achieve a urine volume of at least 2.5 liters daily.
- Clinicians should counsel patients with calcium stones and relatively high urinary calcium to limit sodium intake and consume 1,000-1,200 mg per day of dietary calcium.

- Clinicians should counsel patients with calcium oxalate stones and relatively high urinary oxalate to limit intake of oxalate-rich foods and maintain normal calcium consumption.
- Clinicians should encourage patients with calcium stones and relatively low urinary citrate to increase their intake of fruits and vegetables and limit non-dairy animal protein.
- Clinicians should counsel patients with uric acid stones or calcium stones and relatively high urinary uric acid to limit intake of non-dairy animal protein.
- Clinicians should counsel patients with cystine stones to limit sodium and protein intake.

Pharmacologic Therapies

- Clinicians should offer thiazide diuretics to patients with high or relatively high urine calcium and recurrent calcium stones.
- Clinicians should offer potassium citrate therapy to patients with recurrent calcium stones and low or relatively low urinary citrate.
- Clinicians should offer allopurinol to patients with recurrent calcium oxalate stones who have hyperuricosuria and normal urinary calcium.
- Clinicians should offer thiazide diuretics and/or potassium citrate to patients with recurrent calcium stones in whom other metabolic abnormalities are absent or have been appropriately addressed and stone formation persists.
- Clinicians should offer potassium citrate to patients with uric acid and cystine stones to raise urinary pH to an optimal level.

- Clinicians should not routinely offer allopurinol as first-line therapy to patients with uric acid stones.
- Clinicians should offer cystine-binding thiol drugs, such as alpha-mercaptopyronylglycine (tiopronin), to patients with cystine stones who are unresponsive to dietary modifications and urinary alkalinization, or have large recurrent stone burdens.
- Clinicians may offer acetohydroxamic acid (AHA) to patients with residual or recurrent struvite stones only after surgical options have been exhausted.

Follow-up

- Clinicians should obtain a single 24-hour urine specimen for stone risk factors within six months of the initiation of treatment to assess response to dietary and/or medical therapy.
- After the initial follow-up, clinicians should obtain a single 24-hour urine specimen annually or with greater frequency, depending on stone activity, to assess patient adherence and metabolic response.
- Clinicians should obtain periodic blood testing to assess for adverse effects in patients on pharmacological therapy.
- Clinicians should obtain a repeat stone analysis, when available, especially in patients not responding to treatment.
- Clinicians should monitor patients with struvite stones for reinfection with urease-producing organisms and utilize strategies to prevent such occurrences.

- Clinicians should periodically obtain follow-up imaging studies to assess for stone growth or new stone formation based on stone activity (plain abdominal imaging, renal ultrasonography or low dose computed tomography [CT]).

SURGICAL MANAGEMENT OF STONES

American Urological Association/ Endourological Society Guideline (2016)

Purpose

The purpose of this Guideline is to provide a clinical framework for the surgical management of patients with kidney and/or ureteral stones.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Index Patients

The surgical management of patients with various stones is described below and divided into 13 respective patient profiles. Index Patients 1-10 are non-morbidly obese; non-pregnant adults (≥ 18 years of age) with stones not thought to be composed of uric acid or cystine; normal renal, coagulation and platelet function; normally positioned kidneys; intact lower urinary tracts without ectopic ureters; no evidence of sepsis; and no anatomic or functional obstruction distal to the stone(s). Index Patients 13 and 14 are children (<18 years if age) with similar characteristics to Index Patients 1-10. Index Patient 15 is a pregnant female with symptomatic renal or ureteral stone(s) with normal renal function without urinary tract infection (UTI). The proximal ureter is defined as the segment distal to the ureteropelvic junction (UPJ) and above the upper border of the sacroiliac joint. The middle ureter is that which overlies the sacroiliac joint and the distal ureter that lies below it.

Index Patients

Index Patient 1:	Adult, ≤ 10 mm proximal ureteral stone
Index Patient 2:	Adult, ≤ 10 mm mid ureteral stone
Index Patient 3:	Adult, ≤ 10 mm distal ureteral stone
Index Patient 4:	Adult, >10 mm proximal ureteral stone
Index Patient 5:	Adult, >10 mm mid ureteral stone
Index Patient 6:	Adult, >10 mm distal ureteral stone
Index Patient 7:	Adult, ≤ 20 mm total non-lower pole renal stone burden
Index Patient 8:	Adult, >20 mm total renal stone burden
Index Patient 9:	Adult, ≤ 10 mm lower pole renal stone(s)
Index Patient 10:	Adult, >10 mm lower pole renal stone(s)
Index Patient 11:	Adult, with residual stone(s)
Index Patient 12:	Adult, renal stone(s) with pain and no obstruction
Index Patient 13:	Child, not known to have cystine or uric acid ureteral stone(s)
Index Patient 14:	Child, not known to have cystine or uric acid renal stone(s)
Index Patient 15:	Pregnant female, renal or ureteral stone(s)

Guideline Statements

Imaging, Pre-Operative Testing

- Clinicians should obtain a non-contrast CT scan on patients prior to performing percutaneous nephrolithotomy. (*Strong Recommendation; Evidence Level: Grade C*)
- Clinicians may obtain a non-contrast CT scan to help select the best candidate for shock-wave lithotripsy versus ureteroscopy. (*Conditional Recommendation; Evidence Level: Grade C*)
- Clinicians may obtain a functional imaging study (DTPA or MAG-3) if clinically significant loss of renal function in the involved kidney or kidneys is suspected. (*Conditional Recommendation; Evidence Level: Grade C*)
- Clinicians are required to obtain a urinalysis prior to intervention. In patients with clinical or laboratory signs of infection, urine culture should be obtained. (*Strong Recommendation; Evidence Level: Grade B*)

- Clinicians should obtain a complete blood count and platelet count on patients undergoing procedures where there is a significant risk of hemorrhage or for patients with symptoms suggesting anemia, thrombocytopenia, or infection; serum electrolytes and creatinine should be obtained if there is suspicion of reduced renal function. (*Expert Opinion*)
- In patients with complex stones or anatomy, clinicians may obtain additional contrast imaging if further definition of the collecting system and the ureteral anatomy is needed. (*Conditional Recommendation; Evidence Level: Grade C*)

Treatment of Adult Patients with Ureteral Stones

- Patients with uncomplicated distal ureteral stones ≤ 10 mm should be offered observation, and those with distal stones of similar size should be offered medical expulsive therapy with α -blockers. (Index Patient 3) (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should offer reimaging to patients prior to surgery if passage of stones is suspected or if stone movement will change management. Reimaging should focus on the region of interest and limit radiation exposure to uninvolved regions. (*Clinical Principle*)
- In most patients, if observation with or without medical expulsive therapy is not successful after four to six weeks and/or the patient/clinician decide to intervene sooner based on a shared decision making approach, clinicians should offer definitive stone treatment. (Index Patients 1-3) (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should inform patients that shock-wave lithotripsy is the procedure with the least morbidity and lowest complication rate, but ureteroscopy has a greater stone-free rate in a single procedure. (Index Patients 1-6) (*Strong Recommendation; Evidence Level: Grade B*)
- In patients with mid or distal ureteral stones who require intervention (who were not candidates for or who failed medical expulsive therapy), clinicians should recommend ureteroscopy as first-line therapy. For patients who decline ureteroscopy, clinicians should offer shock-wave lithotripsy. (Index Patients 2,3,5,6) (*Strong Recommendation; Evidence Level: Grade B*)
- Ureteroscopy is recommended for patients with suspected cystine or uric acid ureteral stones who fail medical expulsive therapy or desire intervention. (*Expert Opinion*)
- Routine stenting should not be performed in patients undergoing shock-wave lithotripsy. (Index Patients 1-6) (*Strong Recommendation; Evidence Level: Grade B*)
- Following ureteroscopy, clinicians may omit ureteral stenting in patients meeting all of the following criteria: those without suspected ureteric injury during ureteroscopy, those without evidence of ureteral stricture or other anatomical impediments to stone fragment clearance, those with a normal contralateral kidney, those without renal functional impairment, and those in whom a secondary ureteroscopy procedure is not planned. (Index Patients 1-6) (*Strong Recommendation; Evidence Level: Grade A*)
- Placement of a ureteral stent prior to ureteroscopy should not be performed routinely. (Index Patient 1-6) (*Strong Recommendation; Evidence Level: Grade B*)

- Clinicians may offer α -blockers and antimuscarinic therapy to reduce stent discomfort. (Index Patients 1-6) (*Moderate Recommendation; Evidence Level: Grade B*)
- In patients who fail or are unlikely to have successful results with shock-wave lithotripsy and/or ureteroscopy, clinicians may offer percutaneous nephrolithotomy, laparoscopic, open, or robotic assisted stone removal. (Index Patient 1-6) (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians performing ureteroscopy for proximal ureteral stones should have a flexible ureteroscope available. (Index Patients 1, 4) (*Clinical Principle*)
- Clinicians should not utilize electrohydraulic lithotripsy as the first-line modality for intra-ureteral lithotripsy. (Index Patients 1-6,13,15) (*Expert Opinion*)
- In patients with obstructing stones and suspected infection, clinicians must urgently drain the collecting system with a stent or nephrostomy tube and delay stone treatment. (*Strong Recommendation; Evidence Level: Grade C*)

Treatment of Adult Patients with Renal Stones

- In symptomatic patients with a total non-lower pole renal stone burden ≤ 20 mm, clinicians may offer shock-wave lithotripsy or ureteroscopy. (Index Patient 7) (*Strong Recommendation; Evidence Level: Grade B*)
- In symptomatic patients with a total renal stone burden >20 mm, clinicians should offer percutaneous nephrolithotomy as first-line therapy. (Index Patient 8) (*Strong Recommendation; Evidence Level: Grade C*)
- In patients with total renal stone burden >20 mm, clinicians should not offer shock-wave lithotripsy as first-line therapy. (Index Patient 8) (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians may perform nephrectomy when the involved kidney has negligible function in patients requiring treatment. (Index Patients 1-14) (*Conditional Recommendation; Evidence Level: Grade C*)
- For patients with symptomatic (flank pain), non-obstructing, caliceal stones without another obvious etiology for pain, clinicians may offer stone treatment. (Index Patient 12) (*Moderate Recommendation; Evidence Level: Grade C*)
- For patients with asymptomatic, non-obstructing caliceal stones, clinicians may offer active surveillance. (*Conditional Recommendation; Evidence Level: Grade C*)
- Clinicians should offer shock-wave lithotripsy or ureteroscopy to patients with symptomatic ≤ 10 mm lower pole renal stones. (Index Patient 9) (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should not offer shock-wave lithotripsy as first-line therapy to patients with >10 mm lower pole stones. (Index Patient 10) (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should inform patients with lower pole stones >10 mm in size that percutaneous nephrolithotomy has a higher stone-free rate but greater morbidity. (Index Patient 10). (*Strong Recommendation; Evidence Level: Grade B*)

- In patients undergoing uncomplicated percutaneous nephrolithotomy who are presumed stone-free, placement of a nephrostomy tube is optional. (*Conditional Recommendation; Evidence Level: Grade C*)
- Flexible nephroscopy should be a routine part of standard percutaneous nephrolithotomy. (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians must use normal saline irrigation for percutaneous nephrolithotomy and ureteroscopy. (*Strong Recommendation; Evidence Level: Grade B*)
- In patients not considered candidates for percutaneous nephrolithotomy, clinicians may offer staged ureteroscopy. (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians may prescribe α -blockers to facilitate passage of stone fragments following shock-wave lithotripsy. (*Moderate Recommendation; Evidence Level: Grade B*)
- Shock-wave lithotripsy should not be used in the patient with anatomic or functional obstruction of the collecting system or ureter distal to the stone. (*Strong Recommendation; Evidence Level: Grade C*)
- In patients with symptomatic caliceal diverticular stones, endoscopic therapy (ureteroscopy, percutaneous nephrolithotomy, laparoscopic, robotic) should be preferentially utilized. (*Strong Recommendation; Evidence Level: Grade C*)
- Staghorn stones should be removed if attendant comorbidities do not preclude treatment. (*Clinical Principle*)

Treatment for Pediatric Patients with Ureteral or Renal Stones

- In pediatric patients with uncomplicated ureteral stones ≤ 10 mm, clinicians should offer observation with or without medical expulsive therapy using α -blockers. (Index Patient 13) (*Moderate Recommendation; Evidence Level: Grade B*)
- Clinicians should offer ureteroscopy or shock-wave lithotripsy for pediatric patients with ureteral stones who are unlikely to pass the stones or who failed observation and/or medical expulsive therapy, based on patient-specific anatomy and body habitus. (Index Patient 13) (*Strong Recommendation; Evidence Level: Grade B*)
- Clinicians should obtain a low-dose CT scan on pediatric patients prior to performing percutaneous nephrolithotomy. (Index Patient 13) (*Strong Recommendation; Evidence Level: Grade C*)
- In pediatric patients with ureteral stones, clinicians should not routinely place a stent prior to ureteroscopy. (Index Patient 13) (*Expert Opinion*)
- In pediatric patients with a total renal stone burden ≤ 20 mm, clinicians may offer shock-wave lithotripsy or ureteroscopy as first-line therapy. (Index Patient 14) (*Moderate Recommendation; Evidence Level: Grade C*)
- In pediatric patients with a total renal stone burden >20 mm, both percutaneous nephrolithotomy and shock-wave lithotripsy are acceptable treatment options. If shock-wave lithotripsy is utilized, clinicians should place an internalized ureteral stent or nephrostomy tube. (Index Patient 14) (*Expert Opinion*)

- In pediatric patients, except in cases of coexisting anatomic abnormalities, clinicians should not routinely perform open/laparoscopic/robotic surgery for upper tract stones. (Index Patients 13, 14) (*Expert Opinion*)
- In pediatric patients with asymptomatic and non-obstructing renal stones, clinicians may utilize active surveillance with periodic ultrasonography. (Index Patient 14) (*Expert Opinion*)

Treatment for Pregnant Patients with Ureteral or Renal Stones

- In pregnant patients, clinicians should coordinate pharmacological and surgical intervention with the obstetrician. (Index Patient 15) (*Clinical Principle*)
- In pregnant patients with ureteral stones and well controlled symptoms, clinicians should offer observation as first-line therapy. (Index Patient 15) (*Strong Recommendation; Evidence Level: Grade B*)
- In pregnant patients with ureteral stones, clinicians may offer ureteroscopy to patients who fail observation. Ureteral stent and nephrostomy tube are alternative options with frequent stent or tube changes usually being necessary. (Index Patient 15) (*Strong Recommendation; Evidence Level: Grade C*)

Treatment for All Patients with Ureteral or Renal Stones

- When residual fragments are present, clinicians should offer patients endoscopic procedures to render the patients stone free, especially if infection stones are suspected. (Index Patient 11) (*Moderate Recommendation; Evidence Level: Grade C*)
- Stone material should be sent for analysis. (*Clinical Principle*)
- Open/ laparoscopic /robotic surgery should not be offered as first-line therapy to most patients with stones. Exceptions include rare cases of anatomic abnormalities, with large or complex stones, or those requiring concomitant reconstruction. (Index Patients 1-15) (*Strong Recommendation; Evidence Level: Grade C*)
- A safety guide wire should be used for most endoscopic procedures. (Index Patients 1-15) (*Expert Opinion*)
- Antimicrobial prophylaxis should be administered prior to stone intervention and is based primarily on prior urine culture results, the local antibiogram, and in consultation with the current Best Practice Policy Statement on Urologic Surgery Antibiotic Prophylaxis. (*Clinical Principle*)
- Clinicians should abort stone removal procedures, establish appropriate drainage, continue antibiotic therapy, and obtain a urine culture if purulent urine is encountered during endoscopic intervention. (Index Patients 1-15) (*Strong Recommendation; Evidence Level: Grade C*)
- If initial shock-wave lithotripsy fails, clinicians should offer endoscopic therapy as the next treatment option. (Index Patient 1-14) (*Moderate Recommendation; Evidence Level: Grade C*)
- Clinicians should use ureteroscopy as first-line therapy in most patients who require stone intervention in the setting of uncorrected bleeding diatheses or who require continuous anticoagulation/antiplatelet therapy. (Index Patients 1-15) (*Strong Recommendation; Evidence Level: Grade C*)

SURGICAL TREATMENT OF FEMALE STRESS URINARY INCONTINENCE (SUI)

AUA/SUFU Guideline (2017)

Purpose

Stress urinary incontinence (SUI) is a common problem experienced by many women. SUI can have a significant negative impact on the quality of life (QOL) of not only those who suffer from the condition, but also potentially on those friends and family members whose lives and activities may also be limited. The surgical options for the treatment of SUI continue to evolve; as such, this guideline and the associated algorithm aims to outline the currently available treatment techniques as well as the data associated with each treatment.

AUA Nomenclature

The AUA nomenclature system links statement types to a number of factors including strength of evidence, magnitude of benefit and risks/burdens, and panel judgment. There are three evidence-based statement types: **Strong Recommendations** and **Moderate Recommendations** are directive statements that indicate that there is a net benefit (or harm) associated with a clinical action, while a **Conditional Recommendation** is a non-directive Statement that is used when the clinical action does not have a clear net benefit (or harm).

In addition, there are two statement types that are used when pertinent evidence is not present in the systematic

review of literature associated with the guideline: **Expert Opinions** are statements made by panel consensus based on members' clinical training, experience, knowledge, and judgment, while a **Clinical Principle** is a statement about a component of clinical care that is very widely agreed upon by urologists or other clinicians.

Index Patient

The index patient for this guideline is an otherwise healthy female who is considering surgical therapy for the correction of pure stress and/or stress-predominant mixed urinary incontinence (MUI) who has not undergone previous SUI surgery. Patients with low-grade pelvic organ prolapse were also considered to be index patients. However, while the stage of prolapse was often specified in more recent trials, it was not indicated in many of the earlier studies. Where evidence was available, the data is presented separately for index patients and non-index patients. The Panel recognizes that many women who seek surgical correction of SUI do not meet the definition of the index patient. In fact, most of the studies in the literature do not enroll patients based on this definition of the index patient. Therefore, the Panel felt it was also important to review the literature regarding patients undergoing surgery for SUI who did not meet this definition of the index patient.

Non-index patient

Non-index patients reviewed in this analysis include women with SUI and pelvic prolapse (stage 3 or 4), MUI (non-stress-predominant), incomplete emptying/elevated post-void residual (PVR) and/or other voiding dysfunction,

prior surgical interventions for SUI, recurrent or persistent SUI, mesh complications, high body mass index (BMI), neurogenic lower urinary tract dysfunction, and advanced age (geriatric). Finally, the Panel felt it was important to more fully understand the literature regarding the safety of mesh products used in the surgical treatment of SUI and, therefore, included studies of women who had undergone mesh procedures regardless of whether they were index or non-index patients. The Panel also acknowledges that persistent or recurrent SUI following any SUI treatment is not uncommon; however, there is a lack of robust data to substantiate any recommendation from the Panel regarding the management of these patients.

Definitions

SUI is the symptom of urinary leakage due to increased abdominal pressure, which can be caused by activities such as sneezing, coughing, exercise, lifting, and position change. Though the utility of urethral function assessment remains controversial, some clinicians utilize leak point pressure and others utilize urethral closure pressure. Intrinsic sphincter deficiency (ISD) is often defined as a leak point pressure of less than 60 cm H₂O or a maximal urethral closure pressure of less than 20 cm H₂O, often in the face of minimal urethral mobility. Urgency urinary incontinence (UUI) is the symptom of urinary leakage that occurs in conjunction with the feeling of urgency and a sudden desire to urinate that cannot be deferred. Mixed incontinence refers to a combination of SUI and UUI.

Guideline Statements

Patient Evaluation

- In the initial evaluation of patients with SUI desiring to undergo surgical intervention, physicians should include the following components: *(Clinical Principle)*
 - ✦ History, including assessment of bother
 - ✦ Physical examination, including a pelvic examination
 - ✦ Objective demonstration of SUI with a comfortably full bladder (any method)
 - ✦ Assessment of PVR urine (any method)
 - ✦ Urinalysis
- Physicians should perform additional evaluations in patients being considered for surgical intervention who have the following conditions: *(Expert Opinion)*
 - ✦ Inability to make definitive diagnosis based on symptoms and initial evaluation
 - ✦ Inability to demonstrate SUI
 - ✦ Known or suspected neurogenic lower urinary tract dysfunction
 - ✦ Abnormal urinalysis, such as unexplained hematuria or pyuria
 - ✦ Urgency-predominant MUI
 - ✦ Elevated PVR per clinician judgment
 - ✦ High grade pelvic organ prolapse (POP-Q stage 3 or higher) if SUI not demonstrated with pelvic organ prolapse reduction
 - ✦ Evidence of significant voiding dysfunction
- Physicians may perform additional evaluations in patients with the following conditions: *(Expert Opinion)*

- ✦ Concomitant overactive bladder symptoms
- ✦ Failure of prior anti-incontinence surgery
- ✦ Prior pelvic prolapse surgery

Cystoscopy and Urodynamics Testing

- Physicians should not perform cystoscopy in index patients for the evaluation of SUI unless there is a concern for urinary tract abnormalities. *(Clinical Principle)*
- Physicians may omit urodynamic testing for the index patient desiring treatment when SUI is clearly demonstrated. *(Conditional Recommendation; Evidence Level: Grade B)*
- Physicians may perform urodynamic testing in non-index patients. *(Expert Opinion)*

Patient Counseling

- In patients wishing to undergo treatment for SUI, the degree of bother that their symptoms are causing them should be considered in their decision for therapy. *(Expert Opinion)*
- In patients with SUI or stress-predominant MUI who wish to undergo treatment, physicians should counsel regarding the availability of the following treatment options: *(Clinical Principle)*
 - ✦ Observation
 - ✦ Pelvic floor muscle training (\pm biofeedback)
 - ✦ Other non-surgical options (e.g., continence pessary)
 - ✦ Surgical intervention
- Physicians should counsel patients on potential complications specific to the treatment options. *(Clinical Principle)*

- Prior to selecting midurethral synthetic sling procedures for the surgical treatment of SUI in women, physicians must discuss the specific risks and benefits of mesh as well as the alternatives to a mesh sling. (*Clinical principle*)

Treatment

- In patients with SUI or stress-predominant MUI, physicians may offer the following non-surgical treatment options: (*Expert Opinion*)
 - ✦ Continenence pessary
 - ✦ Vaginal inserts
 - ✦ Pelvic floor muscle exercises
- In index patients considering surgery for SUI, physicians may offer the following options: (*Strong Recommendation; Evidence Level: Grade A*)
 - ✦ Midurethral sling (synthetic)
 - ✦ Autologous fascia pubovaginal sling
 - ✦ Burch colposuspension
 - ✦ Bulking agents
- In index patients who select midurethral sling surgery, physicians may offer either the retropubic or transobturator midurethral sling. (*Moderate Recommendation; Evidence Level: Grade A*)
- Physicians may offer single-incision slings to index patients undergoing midurethral sling surgery with the patient informed as to the immaturity of evidence regarding their efficacy and safety. (*Conditional Recommendation; Evidence Level: Grade B*)
- Physicians should not place a mesh sling if the urethra is inadvertently injured at the time of a planned midurethral sling procedure. (*Clinical Principle*)

- Physicians should not offer stem cell therapy for stress incontinent patients outside of investigative protocols. (*Expert Opinion*)

Special Cases

- In patients with SUI and a fixed, immobile urethra (often referred to as 'intrinsic sphincter deficiency') who wish to undergo treatment, physicians should offer pubovaginal slings, retropubic midurethral slings, or urethral bulking agents. (*Expert Opinion*)
- Physicians should not utilize a synthetic midurethral sling in patients undergoing concomitant urethral diverticulectomy, repair of urethrovaginal fistula, or urethral mesh excision and stress incontinence surgery. (*Clinical Principle*)
- Physicians should strongly consider avoiding the use of mesh in patients undergoing stress incontinence surgery who are at risk for poor wound healing (e.g., following radiation therapy, presence of significant scarring, poor tissue quality). (*Expert Opinion*)
- In patients undergoing concomitant surgery for pelvic prolapse repair and SUI, physicians may perform any of the incontinence procedures (e.g., midurethral sling, pubovaginal sling, Burch colposuspension). (*Conditional Recommendation; Evidence Level: Grade C*)
- Physicians may offer patients with SUI and concomitant neurologic disease affecting lower urinary tract function (neurogenic bladder) surgical treatment of SUI after appropriate evaluation and counseling have been performed. (*Expert Opinion*)

- Physicians may offer synthetic midurethral slings, in addition to other sling types, to the following patient populations after appropriate evaluation and counseling have been performed: (*Expert Opinion*)
 - ◆ Patients planning to bear children
 - ◆ Diabetes
 - ◆ Obesity
 - ◆ Geriatric

Outcomes Assessment

- Physicians or their designees should communicate with patients within the early postoperative period to assess if patients are having any significant voiding problems, pain, or other unanticipated events. If patients are experiencing any of these outcomes, they should be seen and examined. (*Expert Opinion*)
- Patients should be seen and examined by their physicians or designees within six months post-operatively. Patients with unfavorable outcomes may require additional follow-up. (*Expert Opinion*)
 - ◆ The subjective outcome of surgery as perceived by the patient should be assessed and documented.
 - ◆ Patients should be asked about residual incontinence, ease of voiding/force of stream, recent urinary tract infection, pain, sexual function, and new onset or worsened overactive bladder symptoms.
 - ◆ A physical exam, including an examination of all surgical incision sites, should be performed to evaluate healing, tenderness, mesh extrusion (in the case of synthetic slings), and any other potential abnormalities.

- ◆ A PVR should be obtained.
- ◆ A standardized questionnaire (e.g. PGI-I) may be considered.

Female Stress Urinary Incontinence: AUA/SUFU Evaluation and Treatment Algorithm

EVALUATION (INDICATIONS)

Initial evaluation

The initial evaluation of patients desiring to undergo surgical intervention should include the following components:

- History
- Physical exam
- Demonstration of SUI
- PVR assessment
- Urinalysis

Cystoscopy

Should not be performed unless there is a concern for lower urinary tract abnormalities

Urodynamics

May be omitted when SUI is clearly demonstrated

Additional evaluation

Additional evaluation **should** be performed in the following scenarios:

- Lack of definitive diagnosis
- Inability to demonstrate SUI
- Known/suspected NLUTD
- Abnormal urinalysis
- Urgency-predominant MUI
- Elevated PVR
- High-grade POP (if SUI not demonstrated with POP reduction)
- Evidence of significant voiding dysfunction

Additional evaluation **may** be performed in the following scenarios:

- Concomitant OAB symptoms
- Failure of prior anti-incontinence surgery
- Prior POP surgery

In patients who wish to undergo treatment, physicians should counsel regarding the availability of observation, pelvic floor muscle training, other non-surgical options, and surgical interventions. Physicians should counsel patients on potential complications specific to the treatment options.

TREATMENT

Non-Surgical

- Contineness pessary
- Vaginal inserts
- Pelvic floor muscle exercises

Surgical

- Bulking agents
- Midurethral sling (synthetic)
- Autologous fascia pubovaginal sling
- Burch colposuspension

If a midurethral sling surgery is selected, either the retropubic or transobturator midurethral sling may be offered. A single-incision sling may be offered to index patients if they are informed as to the immaturity of evidence regarding their efficacy and safety. Physicians must discuss the specific risks and benefits of mesh as well as alternatives to a mesh sling.

SPECIAL CASES

1. Fixed immobile urethra

- Pubovaginal sling
- Retropubic midurethral sling
- Urethral bulking agents

2. Concomitant surgery for POP repair and SUI

Any incontinence procedure

3. Concomitant NLUTD

Surgical treatment following appropriate evaluation and counseling

4. Child-bearing, diabetes, obesity, geriatric

Surgical treatment following appropriate evaluation and counseling

MUI= mixed urinary incontinence; NLUTD= neurogenic lower urinary tract dysfunction; OAB= overactive bladder; POP= pelvic organ prolapse; PVR= post-void residual; SUI= stress urinary incontinence

ADULT URODYNAMICS

AUA Guideline (2012)

This AUA Guideline on Urodynamics is intended to review the literature regarding the use of urodynamic testing in common lower urinary tract disorders. It presents the principles of urodynamic application and technique in order to guide the clinician in the most effective utilization of these studies. Urodynamics (UDS) is the dynamic study of the transport, storage and evacuation of urine. UDS is an interactive diagnostic study of the lower urinary tract composed of a number of tests that can be used to obtain functional information about urine storage and emptying. Urodynamic studies are only one part of the comprehensive evaluation of lower urinary tract symptoms (LUTS). The findings of this guideline are intended to assist the clinician in the appropriate selection of urodynamic tests following an appropriate evaluation and symptom characterization. Clinicians evaluating these disorders utilize history, physical examination, questionnaires and pad testing data collectively in the evaluation of these symptoms.

This systematic review evaluated the following urodynamic tests: **post-void residual (PVR); uroflowmetry; cystometry; pressure-flow studies; videourodynamics; EMG; urethral function tests: abdominal leak point pressure (ALPP) or valsalva leak point pressure (VLPP), urethral pressure profile, maximum urethral closure pressure (MUCP); or any combination of the above tests.** This review examined the role of these tests in: diagnosis, prognosis, clinical management decisions and patient outcomes.

The target populations comprised adults with the following: stress urinary incontinence (SUI) and pelvic organ prolapse; overactive bladder (OAB), urgency urinary incontinence, mixed incontinence; lower urinary tract symptoms (LUTS); and neurogenic bladder (NGB).

SUI/Prolapse

- Clinicians who are making the diagnosis of urodynamic stress incontinence should assess urethral function.
 - ✦ During multi-channel UDS, the clinical tools necessary for the assessment of urethral function are already in place.
 - ✦ A quantitative assessment, such as VLPP or MUCP, should be performed.
 - ✦ Information regarding urethral function may be used to guide surgical treatment decisions.
- Surgeons considering invasive therapy in patients with SUI should assess post-void residual (PVR) urine volume.
 - ✦ An elevated PVR suggests an abnormality of bladder emptying.
 - ✦ Patients with an elevated preoperative PVR may be at an increased risk for transient or permanent postoperative voiding difficulties following intervention.
- Clinicians may perform multi-channel urodynamics in patients with both symptoms and physical findings of stress incontinence who are considering invasive, potentially morbid or irreversible treatments.
 - ✦ Multi-channel UDS are an optional preoperative study in the patient considering surgery for SUI.
 - ✦ UDS may confirm or refute a clinical diagnosis, facilitate treatment selection and patient counseling.

- ✦ UDS may be particularly helpful in complicated patients: previous surgery, mixed storage symptoms or symptoms of impaired emptying.
- Clinicians should perform repeat stress testing with the urethral catheter removed in patients suspected of having SUI who do not demonstrate this finding with the catheter in place during urodynamic testing.
 - ✦ Some patients with SUI determined during the physical examination will not have the finding of SUI with a urethral catheter in place.
 - ✦ Removal of the urodynamic catheter will allow demonstration of SUI with repeat stress maneuvers.
 - ✦ Care must be taken to preserve the sterility of the urethral catheter.
- In women with high grade pelvic organ prolapse (POP) but without the symptom of SUI, clinicians should perform stress testing with reduction of the prolapse. Multi-channel urodynamics with prolapse reduction may be used to assess for occult stress incontinence and detrusor dysfunction in these women with associated LUTS.
 - ✦ A significant proportion of women with high grade POP who do not have the symptom of SUI will be found to have occult SUI, after reduction of the prolapse.
 - ✦ If the presence of SUI would change the surgical treatment plan, stress testing with reduction of the prolapse to evaluate for occult SUI should be performed.
 - ✦ Multi-channel UDS can also assess for the presence of detrusor dysfunction in women with high grade POP. In women with clinical suspicion(s) of bladder dysfunction, UDS may be helpful in the prediction of postoperative bladder function following surgery.

Overactive Bladder (OAB), Urgency Urinary Incontinence (UUI), Mixed Incontinence

- Clinicians may perform multi-channel filling cystometry when it is important to determine if altered compliance, detrusor overactivity or other urodynamic abnormalities are present (or not) in patients with urgency urinary incontinence in whom invasive, potentially morbid or irreversible treatments are considered.
 - ✦ Multi-channel cystometry is preferred over a single channel “simple” cystometrogram.
 - ✦ Urodynamic findings of storage abnormalities include: detrusor overactivity, increased filling sensation, and abnormalities of compliance.
 - ✦ Compliance determination is a very important measurement, particularly in patients with neurogenic conditions.
 - ✦ UDS may have a role in the clinical circumstances where conservative and drug therapies fail in a patient who desires more invasive treatment options for OAB. UDS findings may ultimately effect treatment decision.
- Clinicians may perform pressure flow studies (PFS) in patients with refractory urgency urinary incontinence after bladder outlet procedures to evaluate for bladder outlet obstruction (BOO).
 - ✦ Symptoms of bladder storage failure may present as a consequence of bladder outlet obstruction following anti-incontinence surgeries.
 - ✦ PVR volumes alone cannot diagnose bladder outlet obstruction.
 - ✦ In women with storage symptoms refractory to treatment following anti-incontinence surgery, UDS can be utilized to identify outlet obstruction.

- Clinicians should counsel patients with urgency urinary incontinence and mixed incontinence that the absence of detrusor overactivity (DO) on a single urodynamic study does not exclude it as a causative agent for their symptoms.
 - ✦ UDS may not diagnose DO even in patients who are very symptomatic. UDS in these patients should be interpreted in the context of overall clinical assessment.
 - ✦ UDS may be useful in determining the presence or absence of other factors (SUI, BOO) that could influence treatment decisions.

Neurogenic Bladder

- Clinicians should perform PVR assessment, either as part of a complete urodynamic study or separately, during the initial urological evaluation of patients with relevant neurological conditions (such as spinal cord injury and myelomeningocele) and as part of ongoing follow-up when appropriate.
 - ✦ PVR is a useful tool for assessing the possibility of significant bladder and/or outlet dysfunction.
 - ✦ Evaluation with PVR assessment is appropriate both at the time of diagnosis and after to monitor for changes in bladder emptying ability periodically.
 - ✦ PVR assessment has been shown to influence treatment planning in a variety of neurological conditions.
 - ✦ The implications of an elevated PVR in neurogenic voiding dysfunction include the development of UTIs, urosepsis, upper tract deterioration and stone disease.
- Clinicians should perform a complex cystometrogram (CMG) during initial urological evaluation of patients with relevant neurological conditions with or without

symptoms, and as part of ongoing follow-up when appropriate. In patients with other neurologic diseases, physicians may consider CMG as an option in the urological evaluation of patients with LUTS.

- ◆ CMG in patients with neurogenic bladder disorders will give an accurate assessment of bladder storage.
- ◆ The maintenance of low intravesical pressures is a clinical principle, originally described in patients with myelomeningocele that has been adopted for other neurological conditions, such as spinal cord injury.
- ◆ CMG provides diagnostic, therapeutic and prognostic information in select patients with neurogenic bladder.
- Clinicians should perform pressure flow analysis in patients with relevant neurologic disease with or without symptoms, or in patients with other neurologic disease and elevated PVR or urinary symptoms.
 - ◆ Pressure flow studies (PFS) are an appropriate component of the work-up of NGB, particularly for patients at risk for or found to have elevated PVR, hydronephrosis, pyelonephritis, complicated UTIs and frequent episodes of autonomic dysreflexia.
 - ◆ PFS can accurately distinguish between BOO and detrusor hypocontractility/acontractility in NGB patients with emptying disorders.
 - ◆ PFS can be used to delineate possible treatment options and monitor outcomes.
- When available, clinicians may perform fluoroscopy at the time of urodynamics (videourodynamics) in patients with relevant neurologic disease at risk for neurogenic bladder, or in patients with other neurologic disease and elevated PVR or urinary symptoms.

- ◆ Videourodynamic assessment provides anatomic imaging correlation with the functional assessment of PFS.
- ◆ Videourodynamics improves the diagnosis of: vesicoureteral reflux, bladder trabeculation/diverticuli, bladder stones and bladder neck abnormalities.
- ◆ Videourodynamics aids in precise localization of the level of obstruction.

- Clinicians should perform electromyography (EMG) in combination with CMG with or without pressure-flow study in patients with relevant neurologic disease at risk for neurogenic bladder, or in patients with other neurologic disease and elevated PVR or urinary symptoms.
 - ◆ EMG testing is a useful modality to assist in the diagnosis of detrusor external sphincter dyssynergia (DESD), characterized by involuntary contractions of the external sphincter during detrusor contraction.
 - ◆ Artifacts are common, and interpretation of EMG requires close interaction between the clinician and the patient.

Lower Urinary Tract Symptoms

- Clinicians may perform PVR in patients with LUTS as a safety measure to rule out significant urinary retention both initially and during follow up.
 - ◆ PVR assessment may identify patients with significant urinary retention, thus decreasing potential morbidity.
 - ◆ PVR assessment may be utilized to monitor the response to treatment of voiding disorders.
 - ◆ PVR assessment may be safely performed by ultrasound, without the need for catheterization.
- Uroflow may be used by clinicians in the initial and ongoing evaluation of male patients with LUTS that

suggest an abnormality of voiding/emptying.

- ◆ Uroflow measurement provides an objective and quantitative indication of bladder and outlet function.
 - ◆ Abnormalities in uroflow may indicate the need for further urodynamic testing, as this indicates a dysfunction in the voiding phase of micturition.
 - ◆ Uroflowmetry can also be used for monitoring treatment outcomes and correlating symptoms with objective findings.
 - ◆ Clinicians should be aware that uroflow studies (both peak and mean) can be affected by the volume voided and the circumstances of the test.
- Clinicians may perform multi-channel filling cystometry when it is important to determine if detrusor overactivity or other abnormalities of bladder filling/urine storage are present in patients with LUTS, particularly when invasive, potentially morbid or irreversible treatments are considered.
 - ◆ The presence of DO or impaired compliance, which may be diagnosed by cystometry, remains an important piece of information in determining treatment options.
 - Clinicians should perform pressure flow studies in men when it is important to determine if urodynamic obstruction is present in men with LUTS, particularly when invasive, potentially morbid or irreversible treatments are considered.
 - ◆ Bladder outlet obstruction in men is a urodynamic diagnosis.
 - ◆ A diagnosis of obstruction on a PFS may predict a better outcome following surgery than those who are unobstructed.

- ◆ PFS can be recommended in men seeking surgical therapy for relief of LUTS.
- Clinicians may perform pressure flow studies in women when it is important to determine if obstruction is present.
 - ◆ PFS should always be correlated with symptoms and other diagnostic tests to obtain the most accurate diagnosis of bladder outlet obstruction in women.
 - ◆ Documentation of obstruction in women will likely influence treatment decisions, and PFS are one way to obtain this diagnosis.
 - Clinicians may perform videourodynamics in properly selected patients to localize the level of obstruction, particularly for the diagnosis of primary bladder neck obstruction (PBNO).
 - ◆ Primary bladder neck obstruction is a disorder characterized by a delay or failure of the bladder neck to open during a voluntary detrusor contraction.
 - ◆ In young men and women without an obvious anatomic cause of obstruction like benign prostatic obstruction (BPO) in men or POP in women, videourodynamics can differentiate between functional causes of obstruction like PBNO and dysfunctional voiding.
 - ◆ PBNO is a videourodynamic diagnosis in which the hallmark is relatively high detrusor pressures in association with low flow and radiographic evidence of obstruction at the bladder neck.

UROTRAUMA

AUA Guideline (2014)

Purpose

Urologic injury often occurs in the context of severe multisystem trauma that requires close cooperation with trauma surgeons. The urologist remains an important consultant to the trauma team, helping to ensure that the radiographic evaluation of urogenital structures is performed efficiently and accurately, and that the function of the genitourinary system is preserved whenever possible. Immediate interventions for acute urologic injuries often require flexibility in accordance with damage control principles in critically ill patients. In treating urotrauma patients, urologists must be familiar with both open surgical techniques and minimally invasive techniques for achieving hemostasis and/or urinary drainage. The Panel's purpose is to review the existing literature pertaining to the acute care of urologic injuries in an effort to develop effective guidelines for appropriate diagnosis and intervention strategies in the setting of urotrauma.

Guideline Statements

Renal Trauma

- Clinicians should perform diagnostic imaging with intravenous (IV) contrast enhanced computed tomography (CT) in stable blunt trauma patients with gross hematuria or microscopic hematuria and systolic blood pressure < 90mmHG.
- Clinicians should perform diagnostic imaging with IV contrast enhanced CT in stable trauma patients with

mechanism of injury or physical exam findings concerning for renal injury (e.g., rapid deceleration, significant blow to flank, rib fracture, significant flank ecchymosis, penetrating injury of abdomen, flank, or lower chest).

- Clinicians should perform IV contrast enhanced abdominal/pelvic CT with immediate and delayed images when there is suspicion of renal injury.
- Clinicians should use non-invasive management strategies in hemodynamically stable patients with renal injury.
- The surgical team must perform immediate intervention (surgery or angioembolization in selected situations) in hemodynamically unstable patients with no or transient response to resuscitation.
- Clinicians may initially observe patients with renal parenchymal injury and urinary extravasation.
- Clinicians should perform follow-up CT imaging for renal trauma patients having either (a) deep lacerations (AAST Grade IV-V) or (b) clinical signs of complications (e.g., fever, worsening flank pain, ongoing blood loss, abdominal distention).
- Clinicians should perform urinary drainage in the presence of complications such as enlarging urinoma, fever, increasing pain, ileus, fistula or infection. Drainage should be achieved via ureteral stent and may be augmented by percutaneous urinoma drain, percutaneous nephrostomy or both.

Ureteral Trauma

- Clinicians should perform IV contrast enhanced abdominal/pelvic CT with delayed imaging (urogram) for stable trauma patients with suspected ureteral injuries.
- Clinicians should directly inspect the ureters during laparotomy in patients with suspected ureteral injury who have not had preoperative imaging.
- Surgeons should repair traumatic ureteral lacerations at the time of laparotomy in stable patients.
- Surgeons may manage ureteral injuries in unstable patients with temporary urinary drainage followed by delayed definitive management.
- Surgeons should manage traumatic ureteral contusions at the time of laparotomy with ureteral stenting or resection and primary repair depending on ureteral viability and clinical scenario.
- Surgeons should attempt ureteral stent placement in patients with incomplete ureteral injuries diagnosed postoperatively or in a delayed setting.
- Surgeons should perform percutaneous nephrostomy with delayed repair as needed in patients when stent placement is unsuccessful or not possible.
- Clinicians may initially manage patients with ureterovaginal fistula using stent placement. In the event of stent failure, clinicians may pursue surgical intervention.
- Surgeons should repair ureteral injuries located proximal to the iliac vessels with primary repair over a ureteral stent, when possible.

- Surgeons should repair ureteral injuries located distal to the iliac vessels with ureteral reimplantation or primary repair over a ureteral stent, when possible.
- Surgeons should manage endoscopic ureteral injuries with a ureteral stent and/or percutaneous nephrostomy tube, when possible.
- Surgeons may manage endoscopic ureteral injuries with open repair when endoscopic or percutaneous procedures are not possible or fail to adequately divert the urine.

Bladder Trauma

- Clinicians must perform retrograde cystography (plain film or CT) in stable patients with gross hematuria and pelvic fracture.
- Clinicians should perform retrograde cystography in stable patients with gross hematuria and a mechanism concerning for bladder injury, or in those with pelvic ring fractures and clinical indicators of bladder rupture.
- Surgeons must perform surgical repair of intraperitoneal bladder rupture in the setting of blunt or penetrating external trauma.
- Clinicians should perform catheter drainage as treatment for patients with uncomplicated extraperitoneal bladder injuries.
- Surgeons should perform surgical repair in patients with complicated extraperitoneal bladder injury.
- Clinicians should perform urethral catheter drainage without suprapubic (SP) cystostomy in patients following surgical repair of bladder injuries.

Urethral Trauma

- Clinicians should perform retrograde urethrography in patients with blood at the urethral meatus after pelvic trauma.
- Clinicians should establish prompt urinary drainage in patients with pelvic fracture associated urethral injury.
- Surgeons may place suprapubic tubes (SPTs) in patients undergoing open reduction internal fixation (ORIF) for pelvic fracture.
- Clinicians may perform primary realignment (PR) in hemodynamically stable patients with pelvic fracture associated urethral injury.
- Clinicians should not perform prolonged attempts at endoscopic realignment in patients with pelvic fracture associated urethral injury.
- Clinicians should monitor patients for complications (e.g., stricture formation, erectile dysfunction, incontinence) for at least one year following urethral injury.
- Surgeons should perform prompt surgical repair in patients with uncomplicated penetrating trauma of the anterior urethra.
- Clinicians should establish prompt urinary drainage in patients with straddle injury to the anterior urethra.

Genital Trauma

- Clinicians must suspect penile fracture when a patient presents with penile ecchymosis, swelling, pain cracking or snapping sound during intercourse or manipulation and immediate detumescence.

- Surgeons should perform prompt surgical exploration and repair in patients with acute signs and symptoms of penile fracture.
- Clinicians may perform ultrasound in patients with equivocal signs and symptoms of penile fracture.
- Clinicians must perform evaluation for concomitant urethral injury in patients with penile fracture or penetrating trauma who present with blood at the urethral meatus, gross hematuria or inability to void.
- Surgeons should perform scrotal exploration and debridement with tunical closure (when possible) or orchiectomy (when non-salvageable) in patients with suspected testicular rupture.
- Surgeons should perform exploration and limited debridement of non-viable tissue in patients with extensive genital skin loss or injury from infection, shearing injuries, or burns (thermal, chemical, electrical).
- Surgeons should perform prompt penile replantation in patients with traumatic penile amputation, with the amputated appendage wrapped in saline-soaked gauze, in a plastic bag and placed on ice during transport.
- Clinicians should initiate ancillary psychological, reproductive, and/or interpersonal counseling and therapy for patients with genital trauma when loss of sexual, urinary, and/or reproductive function is anticipated.

VASECTOMY

AUA Guideline (2012), Amended 2015

The purpose of this guideline is to aid clinicians who offer vasectomy services by providing a set of approaches and procedures that maximizes successful vasectomy outcomes and minimizes failure and other adverse events.

Preoperative Practice

- A preoperative interactive consultation should be conducted, preferably in person. If an in-person consultation is not possible, then preoperative consultation by telephone or electronic communication is an acceptable alternative.
- The minimum and necessary concepts that should be discussed in a preoperative vasectomy consultation include the following:
 - ✦ Vasectomy is intended to be a permanent form of contraception.
 - ✦ Vasectomy does not produce immediate sterility.
 - ✦ Following vasectomy, another form of contraception is required until vas occlusion is confirmed by post-vasectomy semen analysis (PVSA).
 - ✦ Even after vas occlusion is confirmed, vasectomy is not 100% reliable in preventing pregnancy.
 - ✦ The risk of pregnancy after vasectomy is approximately 1 in 2,000 for men who have post-vasectomy azoospermia or PVSA showing rare non-motile sperm (RNMS).
 - ✦ Repeat vasectomy is necessary in $\leq 1\%$ of vasectomies, provided that a technique for vas occlusion known to have a low occlusive failure rate has been used.

- ◆ Patients should refrain from ejaculation for approximately one week after vasectomy.
- ◆ Options for fertility after vasectomy include vasectomy reversal and sperm retrieval with in vitro fertilization. These options are not always successful, and they may be expensive.
- ◆ The rates of surgical complications such as symptomatic hematoma and infection are 1-2%. These rates vary with the surgeon's experience and the criteria used to diagnose these conditions.
- ◆ Chronic scrotal pain associated with negative impact on quality of life occurs after vasectomy in about 1-2% of men. Few of these men require additional surgery.
- ◆ Other permanent and non-permanent alternatives to vasectomy are available.
- Clinicians do not need to routinely discuss prostate cancer, coronary heart disease, stroke, hypertension, dementia or testicular cancer in pre-vasectomy counseling of patients because vasectomy is not a risk factor for these conditions.
- Prophylactic antimicrobials are not indicated for routine vasectomy unless the patient presents a high risk of infection.

Anesthesia for Vasectomy

- Vasectomy should be performed with local anesthesia with or without oral sedation. If the patient declines local anesthesia or if the surgeon believes that local anesthesia with or without oral sedation will not be adequate for a particular patient, then vasectomy may be performed with intravenous sedation or general anesthesia.

Vas Isolation

- Isolation of the vas should be performed using a minimally-invasive vasectomy (MIV) technique such as the no-scalpel vasectomy (NSV) technique or other MIV technique.

Vas Occlusion

The Panel defined the acceptable rate of vas occlusion failure to be $\leq 1\%$ across multiple studies conducted by different surgeons with large numbers of patients. Failure of vas occlusion includes failure to achieve azoospermia and failure to achieve RNMS. The Panel found four techniques that satisfy the criterion of $\leq 1\%$ failure rate and, therefore, recommends these four techniques for vas occlusion. These, along with other optional techniques for surgeons with training and/or experience that may produce acceptable failure rates, can be found in Figure 1.

- The ends of the vas should be occluded by one of three divisional methods:
 - ◆ Mucosal cautery (MC) with fascial interposition (FI) and without ligatures or clips applied on the vas;
 - ◆ MC without FI and without ligatures or clips applied on the vas;
 - ◆ Open ended vasectomy leaving the testicular end of the vas unoccluded, using MC on the abdominal end and FI;
- OR** by the non-divisional method of extended electrocautery.
- The divided vas may be occluded by ligatures or clips applied to the ends of the vas, with or without FI, and with or without excision of a short segment of the vas, by surgeons whose personal training and/or experience

enable them to consistently obtain satisfactory results with such methods.

- Routine histologic examination of the excised vas segments is not required.

Postoperative Practice

- Men or their partners should use other contraceptive methods until vasectomy success is confirmed by PVSA.
- To evaluate sperm motility, a fresh uncentrifuged semen sample should be examined within two hours after ejaculation.
- Patients may stop using other methods of contraception when examination of one well-mixed, uncentrifuged, fresh post-vasectomy semen specimen shows azoospermia or only rare non-motile sperm (RNMS or $\leq 100,000$ non-motile sperm/mL).
- Eight to sixteen weeks after vasectomy is the appropriate time range for the first PVSA. The choice of time to do the first PVSA should be left to the judgment of the surgeon.
- Vasectomy should be considered a failure if any motile sperm are seen on PVSA at six months after vasectomy, in which case repeat vasectomy should be considered.
- If $>100,000$ non-motile sperm/mL persist beyond six months after vasectomy, then trends of serial PVSAs and clinical judgment should be used to decide whether the vasectomy is a failure and whether repeat vasectomy should be considered.

FIGURE 1.

Most commonly used vas occlusion techniques and their occlusive failure rates

Definitions and Diagrams:

- FI** fascial interposition
MC mucosal cautery
T testicular end of divided vas
A abdominal end of divided vas
MSI non-divisional extended electrocautery (Marie Stopes International Technique)

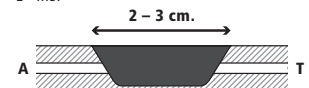


- 3** Testicular end open, abdominal end cauterized with FI



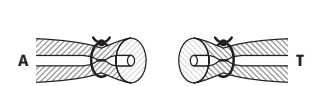
Occlusive Failure Range = 0.0–0.50%

- 4** MSI



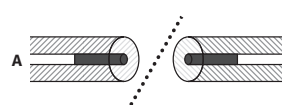
Occlusive Failure = 0.64%

- 5** Ligation both ends without FI



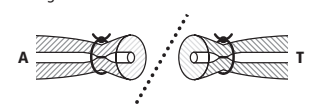
Occlusive Failure Range = 0.0–13.79%

- 1** MC with FI



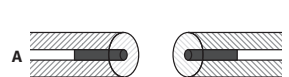
Occlusive Failure Range = 0.0–0.55%

- 6** Ligation both ends with FI



Occlusive Failure Range = 0.0–5.85%

- 2** MC without FI



Occlusive Failure Range = 0.0–0.60%

- 7** Clips both ends without FI



Occlusive Failure Range = 0.0–8.67%

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MANAGEMENT AND SCREENING OF PRIMARY VESICoureTERAL REFLUX IN CHILDREN

AUA Guideline (2010)

The management of vesicoureteral reflux (VUR) has continued to evolve, with practitioners often confronted with conflicting information regarding the outcomes of medical, surgical, and endoscopic therapy, and the efficacy of continuous antibiotic prophylaxis (CAP). In addition, the role of screening has become recognized as important in detecting a population at risk and allowing timely treatment in order to decrease adverse outcomes associated with VUR. This guide discusses the initial evaluation, management and follow-up of the child with VUR along with screening in siblings, offspring, and neonates with prenatal hydronephrosis. Identification of individual risk factors should be taken into consideration when managing the child with VUR, as well as incorporating family choices in care when medical options are not clearly different.

Initial Evaluation of the Child with VUR

- General medical evaluation in all patients:
 - ◆ Measurement of height, weight, and blood pressure, and serum creatinine if bilateral renal abnormalities are found.
 - ◆ Urinalysis for proteinuria and bacteriuria; if urinalysis indicates infection, a urine culture and sensitivity is recommended.

- ◆ A baseline serum creatinine may be obtained to establish an estimate of glomerular filtration rate.
- Imaging procedures:
 - ◆ Renal ultrasound to assess the upper urinary tract is recommended.
 - ◆ DMSA (technetium-99m-labeled dimercaptosuccinic acid) renal imaging can be obtained to assess the kidney for scarring and function.
- Assessment of voiding patterns:
 - ◆ Symptoms indicative of bladder/bowel dysfunction (BBD) should be sought including: urinary frequency and urgency, prolonged voiding intervals, daytime wetting, perineal/penile pain, holding maneuvers (posturing to prevent wetting), and constipation/encopresis.
- Family and patient education:
 - ◆ Discussion should include rationale for treating VUR, potential consequences of untreated VUR, equivalency of certain treatment approaches, assessment of likely adherence with the care plan.
 - ◆ Determination of parental concerns and accommodation of parental preferences when treatment choices offer a similar risk-benefit balance.

Initial Management of the Child with VUR

The goals of management are to 1) prevent recurring febrile urinary tract infection (UTI); 2) prevent renal injury; and 3) minimize morbidity of treatment and follow-up.

- The child with VUR <1 year of age:
 - ◆ CAP is recommended for children <1 year of age with VUR and a history of a febrile UTI.

- ◆ In the absence of a history of febrile UTI, CAP is recommended for the child <1 year of age with VUR grades III–V identified through screening.
- ◆ In the absence of a history of febrile UTI, the child <1 year of age with VUR grades I–II who is identified through screening may be offered CAP.
- ◆ Circumcision of the male infant with VUR may be considered based on an increased risk of UTI in boys who are not circumcised.
 - Parents need to be made aware of this association to permit informed decision-making.
- The child with UTI and VUR >1 year of age (Table 1):
 - ◆ If clinical evidence of BBD is present, treatment is indicated, preferably before any surgical intervention for VUR is undertaken.
- Treatment options include behavioral therapy, biofeedback (for children >5 years of age), anticholinergic medications, alpha blockers, and treatment of constipation.
 - ◆ CAP is recommended for the child with BBD and VUR due to the increased risk of UTI while BBD is present and being treated.
 - ◆ CAP may be considered for the child >1 year of age with a history of UTI and VUR in the absence of BBD.
 - ◆ Observational management without CAP, with prompt initiation of antibiotic therapy for UTI, may be considered for the child >1 year of age with VUR in the absence of BBD, recurrent febrile UTIs, or renal cortical abnormalities.
 - ◆ Surgical intervention for VUR, including both open and endoscopic methods, may be used.

Follow-up Management of the Child with VUR

- General follow-up in all patients:
 - ◆ General evaluation, including monitoring of blood pressure, height, and weight is recommended annually.
 - ◆ Urinalysis for proteinuria and bacteriuria is indicated annually, including a urine culture and sensitivity if the urinalysis is suggestive of infection.
- Imaging – ultrasonography and cystography:
 - ◆ Ultrasonography is recommended every 12 months to monitor renal growth and any parenchymal scarring.
 - ◆ Voiding cystography (radionuclide cystogram or low-dose fluoroscopy, when available) is recommended between 12 and 24 months.
- Longer intervals between follow-up studies are suggested in patients who may have lower rates of spontaneous resolution (i.e. those with VUR grades III-V, BBD, and older age).
 - ◆ If an observational approach without CAP is being used, follow-up cystography is an option.
 - ◆ Follow-up cystography may be performed after 1 year of age in patients with VUR grades I-II; these patients have high rates of spontaneous resolution and boys also have a low risk of recurrent UTI.
 - ◆ A single normal voiding cystogram may serve to establish resolution.
- The clinical significance of grade I VUR, and the need for ongoing evaluation is undefined.
- Imaging – DMSA:
 - ◆ Recommended when renal ultrasound is abnormal, when there is a greater concern for scarring (i.e. breakthrough

UTI [BT-UTI]; grade III-V VUR), or if serum creatinine is elevated.

- ◆ May be considered for follow-up of children with VUR to detect new renal scarring, especially after a febrile UTI.

Interventions for the Child with BT-UTI

- ◆ If symptomatic BT-UTI occurs, a change in therapy is recommended.
 - The clinical scenario will guide the choice of treatment alternatives; this includes VUR grade, degree of renal scarring, if any, and evidence of abnormal voiding patterns (BBD) that might contribute to UTI, as well as parental preferences.
- ◆ Patients receiving CAP with a febrile BT-UTI should be considered for open surgical ureteral reimplantation or endoscopic injection of bulking agents for intervention with curative intent.
- ◆ In patients receiving CAP with a single febrile BT-UTI and no evidence of pre-existing or new renal cortical abnormalities, changing to an alternative antibiotic agent is an option prior to intervention with curative intent.
- ◆ In patients not receiving CAP who develop a febrile UTI, initiation of CAP is recommended.
- ◆ In patients not receiving CAP who develop a non-febrile UTI, CAP is an option; not all cases of pyelonephritis are associated with fever.

Surgical treatment of VUR

- ◆ Surgical treatment of VUR, including both open and endoscopic methods, is an option.
- ◆ Following open surgical or endoscopic procedures for VUR, a renal ultrasound should be obtained to assess for obstruction.

- ◆ Postoperative voiding cystography following endoscopic injection of bulking agents is recommended.
- ◆ Postoperative cystography may be performed following open ureteral reimplantation.

Management Following Resolution of VUR

- ◆ Either spontaneously or by surgical intervention, monitoring of blood pressure, height, and weight, and urinalysis for protein and UTI is recommended annually through adolescence.
- ◆ If both kidneys are normal by ultrasound or DMSA scanning, such follow-up is an option.
- ◆ With the occurrence of a febrile UTI following resolution or surgical treatment of VUR, evaluation for BBD or recurrent VUR is recommended.
- ◆ Discussion is recommended of the long-term concerns of hypertension (particularly during pregnancy), renal functional loss, recurrent UTI, and familial VUR in the child's siblings and offspring with the family and child at an appropriate age.

Screening for VUR in Siblings

The incidence of VUR in siblings of children with VUR is 27% overall and decreases with age. The incidence of VUR in offspring of a parent with reflux is 37%.

- For siblings of children with VUR:
 - ◆ A voiding cystourethrogram (VCUG) or radionuclide cystogram is recommended on evidence of renal cortical abnormalities or renal size asymmetry on ultrasound or a history of UTI in the sibling who has not been tested.
 - ◆ Given that the value of identifying and treating VUR is unproven:

- Ultrasound screening of the kidneys may be performed to identify significant renal scarring and to focus attention on the presence and potential further risk of VUR.
- Screening offspring of patients with VUR can be considered as similar to screening of siblings.

Neonates with Prenatal Hydronephrosis

The incidence of VUR in children who have had hydronephrosis detected prenatally is 16% overall. The likelihood of VUR is not predicted by the severity of the hydronephrosis either prenatally or postnatally.

- ◆ VCUG is recommended for children with high-grade (Society for Fetal Urology [SFU] grade 3 and 4) hydronephrosis, hydroureter or an abnormal bladder on ultrasound (late-term prenatal or postnatal), or who develop a UTI on observation.
- ◆ Screening for VUR in children with a history of prenatally detected hydronephrosis with low grade hydronephrosis (SFU grade 1 or 2) is an option.
- ◆ An observational approach without screening for VUR, with prompt treatment of any UTI, may be taken for children with prenatally detected hydronephrosis (SFU grade 1 or 2).

