

GUIDELINES AT-A-GLANCE

A Quick Reference for Urologists—2011

Current Guidelines on:

- Benign Prostatic Hyperplasia
- Bladder Cancer
- Erectile Dysfunction
- Female Stress Urinary Incontinence
- Interstitial Cystitis/
Bladder Pain Syndrome
- Premature Ejaculation
- Priapism
- Prostate Cancer
- Renal Mass
- Staghorn Calculi
- Ureteral Calculi
- Vesicoureteral Reflux

Current Best Practice Statements on:

- Asymptomatic Microscopic Hematuria
- Antimicrobial Prophylaxis for Urologic Surgery
- Deep Vein Thrombosis
- Male Infertility
- Prostate-specific Antigen



**American
Urological
Association**

Education and Research, Inc.

DEAR READER,

This *Guidelines-At-A-Glance* pocket guide contains essential summarized information from a number of AUA guideline 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. 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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March 15, 2010

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This document provides guidance only and does not establish a fixed set of rules or define the legal standard of care. As medical knowledge expands and technology advances, the guidelines and best practice statements may change. Today they represent not an absolute mandate but rather current proposals or recommendations for treatment under the specific conditions described. For all these reasons, the Guideline and Best Practice Statements do not preempt physician judgment in individual cases. Also, treating physicians must take into account variations in resources, and in patient tolerances, needs and preferences. Conformance with the recommendations reflected in this document cannot guarantee a successful outcome.

**Use of 5 α -Reductase Inhibitors for Prostate Cancer
Chemoprevention: American Society of Clinical Oncology/
American Urological Association 2008 Clinical Practice
Guideline**

This joint guideline between ASCO and AUA is not included in this pocket guide as it is being reviewed by ASCO for a potential update. The current version can be viewed online at:

<http://www.auanet.org/content/guidelines-and-quality-care/clinical-guidelines/main-reports/pcredinh.pdf>

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ANTIMICROBIAL PROPHYLAXIS FOR UROLOGIC SURGERY

Best Practice Statement (2008)

Principles of Surgical Antimicrobial Prophylaxis

Antimicrobial Prophylaxis Recommendations

Table 1. Patient-related Factors Affecting Host Response To Surgical Infections

Table 2. Surgical Wound Classification

Table 3. Prophylaxis for Lower Tract Instrumentation

Table 4. Prophylaxis for Upper Tract Instrumentation

Table 5. Prophylaxis for Open or Laparoscopic Surgery

Table 6. Antimicrobial Agents and Doses for Perioperative Us

Table 7. Criteria for Antimicrobial Prophylaxis for Patients with Orthopaedic Conditions

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 perioperative 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.
- Use surgical antimicrobial prophylaxis when the potential personal and public health-related benefits exceed the risks and anticipated costs.
- 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.
- Extend the duration of prophylaxis 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 agent of choice.
 - ◆ The agent should achieve serum and tissue levels which 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.

- ♦ Administer all agents intravenously except fluoroquinolones, trimethoprim-sulfamethoxazole, oral agents for bowel preparation and some agents given at catheter removal.

- 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 Orthopaedic Considerations

- Use antimicrobial prophylaxis to reduce the risk of:
 - ♦ 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 orthopaedic pins, plates and screws, or
 - ♦ 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	
External 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) ³
Removal of external urinary catheter, ^{3,4} cystography, urodynamic study or simple cystourethroscopy (GU tract)	Patients with risk factors ⁵	Fluoroquinolone Trimethoprim-Sulfamethoxazole	Aminoglycoside ffl Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/ Clavulanate
Cystourethroscopy with manipulation ⁴ (GU tract)	All patients	Fluoroquinolone Trimethoprim-Sulfamethoxazole	Aminoglycoside ffl Ampicillin 1st/2nd gen. Cephalosporin Amoxicillin/Clavulanate
Prostate brachytherapy or cryotherapy (Skin)	Uncertain	1st gen. Cephalosporin	Clindamycin
Transrectal prostate biopsy (Intestine)	All patients	Fluoroquinolone	Aminoglycoside + Metronidazole or Clindamycin

Key: gen., generation; GU, genitourinary.

¹Organisms 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.*

²Order of agents is not indicative of preference.

³If urine culture shows no growth prior to procedure, antimicrobial prophylaxis is not necessary.

⁴Or full course of culture-directed antimicrobials for documented infection (treatment not prophylaxis).

⁵Risk factors – see Table 1.

⁶Includes transurethral resection of bladder tumor and prostate, and any biopsy, resection, fulguration, foreign body removal, urethral dilation or urethrotomy, or ureteral 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) ³
Shock-wave lithotripsy and Ureteroscopy (GU tract)	All patients	Fluoroquinolone Trimethoprim-Sulfamethoxazole	Aminoglycoside ffl 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

Key: gen., generation; GU, genitourinary.

¹Organisms common to the GU tract – *E. coli*, *Proteus sp.*, *Klebsiella sp.*, *Enterococcus*; Skin – *S. aureus*, coagulase negative *Staph. sp.*, Group A *Strep. sp.*

²Order 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) ³
Vaginal surgery (GU tract, skin, and Group B <i>Strep.</i>) and 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 Clindamycin	Ampicillin/Sulbactam Ticarcillin/Clavulanate Piperacillin/Tazobactam

Key: gen., generation; GU, genitourinary.

¹Organisms 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.*

²Order of agents is not indicative of preference.

³Risk factors – see Table 1.

⁴For 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] 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]

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

TABLE 7.

Criteria for Antimicrobial Prophylaxis for Patients with Orthopaedic Conditions

Criteria	
Increased Risk of Hematogenous Total Joint Infection	Increased Risk of Bacteremia Associated With Urologic Procedures
<p>Within 2 years of prosthetic joint replacement</p> <p>Immunocompromise and prosthetic joint replacement:</p> <ul style="list-style-type: none"> ■ Inflammatory arthropathies (e.g., rheumatoid arthritis, systemic lupus erythematosus) ■ Drug-induced immunosuppression ■ Radiation-induced immunosuppression <p>Comorbidity:</p> <ul style="list-style-type: none"> ■ Previous prosthetic joint infection ■ Malnourishment ■ Hemophilia ■ HIV infection ■ Diabetes ■ Malignancy 	<p>Stone manipulation (includes shock-wave lithotripsy)</p> <p>Transmural incision into urinary tract (does not include simple ligation with excision or percutaneous drainage procedure)</p> <p>Endoscopy of upper tract (ureter and kidney)</p> <p>Procedures including bowel segments</p> <p>Transrectal prostate biopsy</p> <p>Urinary tract entry (except for urethral catheterization) in individuals with higher risk of bacterial colonization:</p> <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 replacements. J Urol 2003; 169: 1796.

ASYMPTOMATIC MICROSCOPIC HEMATURIA IN ADULTS

Best Practice Statement (2001)

Detection and Initial Evaluation

Nephrology Evaluation

Urologic Evaluation

Cytology

Imaging

Cystoscopy

Follow-up

Table 1. Reported Causes of Asymptomatic Microscopic Hematuria

Table 2. Imaging Modalities for Evaluation of the Urinary Tract

Figure 1. Initial Evaluation of Asymptomatic Microscopic Hematuria*

Figure 2. Urologic Evaluation of Asymptomatic Microscopic Hematuria

Microscopic hematuria is an incidental finding often discovered as part of a routine examination. Causes of microscopic hematuria range from minor, incidental findings that do not require treatment to highly significant lesions that immediately threaten the patient's life (Table 1). Appropriate renal or urologic evaluation should be performed in all patients with asymptomatic microscopic hematuria who are at risk for urologic disease or primary renal disease. An algorithm for the initial evaluation of asymptomatic microscopic hematuria is presented in Figure 1. Figure 2 presents an algorithm for the urologic evaluation of microscopic hematuria.

Detection and Initial Evaluation

- Base initial determination on microscopic examination of urinary sediment from a freshly voided, clean catch, mid-stream urine specimen.
 - ◆ ≥ 3 red blood cells per high-power field (RBC/HPF) on microscopic evaluation of the urinary sediment from two of three properly collected urinalysis specimens \rightarrow microscopic hematuria
 - ◆ If the patient is high-risk, one sample is enough.
- Identify whether patients are at high risk for primary renal disease:
 - ◆ presence of significant proteinuria
 - ◆ presence of renal insufficiency
 - ◆ presence of dysmorphic RBCs in the urine
 - ◆ predominance of red cell casts
 - ◆ elevated serum creatinine level
- Identify whether patients are at high risk for urologic disease:
 - ◆ smoking history
 - ◆ occupational exposure to chemicals or dyes
 - ◆ history of gross hematuria
 - ◆ age > 40 years
 - ◆ previous urologic disorder or disease
 - ◆ history of irritative voiding symptoms
 - ◆ history of recurrent urinary tract infection despite appropriate use of antibiotics

Nephrology Evaluation

- Recommended when initial evaluation of the urinary sediment identifies a patient with parenchymal renal disease.
- If systemic causes are not identified in the diagnostic evaluation, consider a renal biopsy for prognosis and guidance of

therapy.

Urologic Evaluation

- Components of initial evaluation:
 - ◆ careful medical history
 - ◆ physical examination
 - ◆ urethral and vaginal examination in women
 - ◆ clean catch specimen, via catheter if evidence of vaginal contamination or if phimosis is present
- Components of laboratory analysis:
 - ◆ examination of the urine and urinary sediment
 - ◆ determination of RBCs/HPF count
 - ◆ determination of presence of dysmorphic RBCs or red cell casts
 - ◆ test for presence and degree of proteinuria
 - ◆ test for urinary tract infection (UTI)
 - ◆ measure serum creatinine
 - ◆ other tests as needed

Cytology

- Recommended:
 - ◆ when risk factors for transitional cell carcinoma are present (Figure 1)
 - ◆ as an adjunct to cystoscopic evaluation of the bladder, if there is a question of irritative voiding symptoms (especially in determination of carcinoma in situ)
 - ◆ in a patient without risk factors for transitional cell carcinoma (or perform cystoscopy)
- Obtain urothelial cells which routinely exfoliate into the urine:
 - ◆ from a voided specimen

- ◆ from a bladder wash specimen in which bladder is irrigated at time of cystoscopy or bladder catheterization

Imaging

- Indicated for detection of renal cell carcinoma, transitional cell carcinoma in the pelvicaliceal system or ureter, urolithiasis and renal infection.
- See Table 2 for modalities, advantages and disadvantages.
- Use plain abdominal radiography and ultrasonography (US) in low-risk patients with a contraindication to iodine contrast media.
- Use US and retrograde pyelography for other than low-risk patients with a contraindication to iodine contrast media.
- Magnetic resonance imaging (MRI), although highly effective for detection of small renal masses, is a second line test due to cost and limited availability.

Cystoscopy

- Recommended to exclude the presence of bladder cancer in:
 - ◆ all adults > 40 years of age, or
 - ◆ all adults < 40 years of age with risk factors for bladder cancer (Figure 1).
- Can defer initial procedure in patients at low risk for bladder cancer (< 40 years without risk factors for bladder cancer), however, urine cytology should then be performed.
- Flexible cystoscopy causes less pain and post-procedure complications, and appears to be at least equivalent in effectiveness to rigid cystoscopy.

- Development of gross hematuria and/or irritative voiding symptoms (in the absence of UTI) should prompt referral for cystoscopy.

Follow-up

- Because the appearance of microscopic hematuria can precede the development of bladder cancer by several years, follow up is important.
- Consider repeat urinalysis, voided urine cytology and blood pressure determination at 6, 12, 24 and 36 months for patients with a negative initial evaluation.
- Recommended for patients with persistent hematuria in whom there is a high index of suspicion for significant underlying disease.
- At 6, 12, 24 and 36 months, repeat:
 - ◆ a urinalysis.
 - ◆ a voided urine cytology, and
 - ◆ blood pressure determination.
- Consider cystoscopy, cytology and/or repeat imaging for all patients if any of the following occur:
 - ◆ development of gross hematuria,
 - ◆ abnormal urinary cytology, or
 - ◆ irritative voiding symptoms in the absence of infection.
- Consider further evaluation for renal parenchymal disease or referral to a nephrologist if hematuria persists and hypertension, proteinuria or evidence of glomerular bleeding (red cell casts, dysmorphic RBCs) develop.

TABLE 1.

Reported Causes of Asymptomatic Microscopic Hematuria

Life-threatening	Significant, Requiring Treatment	Significant, Requiring Observation	Insignificant
Bladder cancer	Renal calculus	Radiation cystitis	Urethrotrigonitis
Renal cell carcinoma	Vesicoureteral reflux	Bladder diverticulum	Renal cyst
Prostate cancer	Bacterial cystitis	Atrophic kidney	Duplicated collecting system
Ureteral transitional cell carcinoma	Bladder calculus	Bladder neck contracture	Prostatic calculus
Renal transitional cell carcinoma	Ureteropelvic junction obstruction	Interstitial cystitis	Bladder neck polyps
Metastatic carcinoma	Renal parenchymal disease	Asymptomatic BPH	Urethral polyps
Urethral cancer	Symptomatic BPH	Papillary necrosis	Bladder varices/telangiectasia
Penile cancer	Urethral stricture/meatal stenosis	Renal arteriovenous fistula	Scarred kidney
Renal lymphoma	Bladder papilloma	Renal contusion	Trabeculated bladder
Abdominal aortic aneurysm	Mycobacterial cystitis	Polycystic kidney	Urethral caruncle
	Pyelonephritis	Prostatitis	Pseudomembranous trigonitis
	Hydronephrosis	Cystocele	Urethritis
	Ureteral calculus	Neurogenic bladder	Pelvic kidney
	Renal artery stenosis	Cystitis cystica/glandularis	Calyceal diverticulum
	Renal parenchymal disease	Ureterocele	Exercise hematuria
	Renal vein thrombosis	Eosinophilic cystitis	
		Phimosis	

Adapted with permission from: Grossfeld GD, Carroll PR. Evaluation of symptomatic microscopic hematuria. Urol Clin N America 1998; 25:661-676.

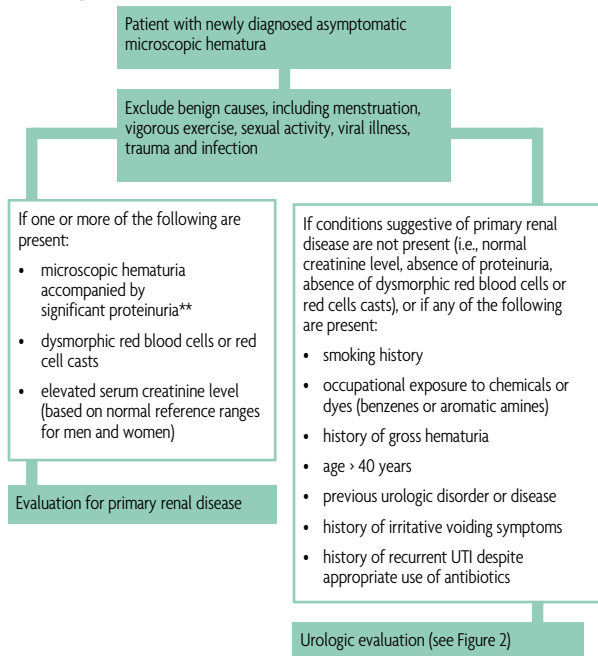
TABLE 2.

Imaging Modalities for Evaluation of the Urinary Tract

Modality	Advantages/Disadvantages
Intravenous urography	<p>Considered by many the best initial study for evaluation of urinary tract</p> <p>Widely available and most cost-efficient in most centers</p> <p>Limited sensitivity in detecting small renal masses</p> <p>Cannot distinguish solid from cystic masses; therefore, further lesion characterization by ultrasonography, computed tomography or magnetic resonance imaging is necessary</p> <p>Better than ultrasonography for detection of transitional cell carcinoma in kidney or urethra</p>
Ultrasonography	<p>Excellent for detection and characterization of renal cysts</p> <p>Limitations in detection of small solid lesions (< 3 cm)</p>
Computed tomography	<p>Preferred modality for detection and characterization of solid renal masses</p> <p>Detection rate for renal masses comparable to that of magnetic resonance imaging, but more widely available and less expensive</p> <p>Best modality for evaluation of urinary stones, renal and perirenal infection and associated complications</p> <p>Sensitivity of 94–98% for detection of renal stones, compared with 52–59% for intravenous urography and 19% for ultrasonography</p>

FIGURE 1.

Initial Evaluation of Asymptomatic Microscopic Hematuria*

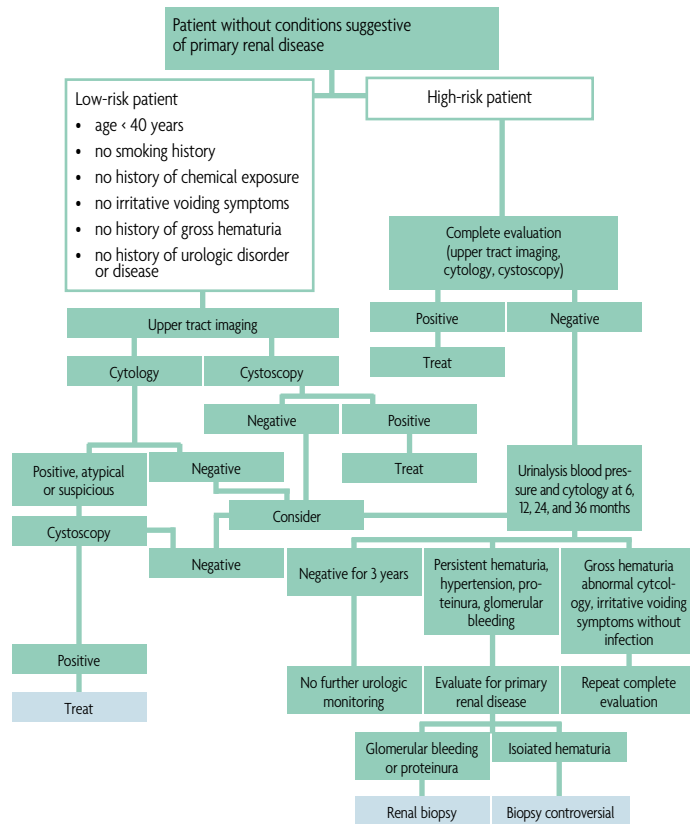


* The recommended definition of microscopic hematuria is three or more RBC/HPF on microscopic evaluation of two of three properly collected specimens.

** Proteinuria of 1+ or greater on dipstick urinalysis should prompt a 24-hour urine collection to quantitate the degree of proteinuria. A total protein excretion of > 1,000 mg per 24 hours (1 g per day) should prompt a thorough evaluation or nephrology referral. Such an evaluation should also be considered for lower levels of proteinuria (> 500 mg per 24 hours [0.5 g per day]), particularly if the protein excretion is increasing or persistent, or if there are other factors suggestive of renal parenchymal disease.

FIGURE 2.

Urologic Evaluation of Asymptomatic Microscopic Hematuria



Based on articles from *UROLOGY*, Vol 57, 2001. Grossfeld et al, "Evaluation of Asymptomatic Microscopic Hematuria in Adults: The American Urological Association Best Practice Policy - Part I Definition, Detection, Prevalence and Etiology," and "Part II: Patient Evaluation, Cytology, Voided Markers, Imaging, Cystoscopy, Nephrology Evaluation and Follow Up," pages 599-610. Copyright (2001), with permission from Elsevier.

MANAGEMENT OF BENIGN PROSTATIC HYPERPLASIA

Guideline (2010)

Evaluation of Benign Prostatic Hyperplasia

Initial Management and Preliminary Discussion of

Treatment Options with the Patient

Treatment Recommendations

Therapies for Patients with Uncommon or Serious

Complications of BPH

Figure 1. Basic Management of LUTS in Men

Figure 2. Detailed Management for Persistent

Bothersome LUTS after Basic Management

Table 1.1 Treatment alternatives for patients with moderate to severe symptoms of BPH

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 treat-

ment;

- ◆ 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

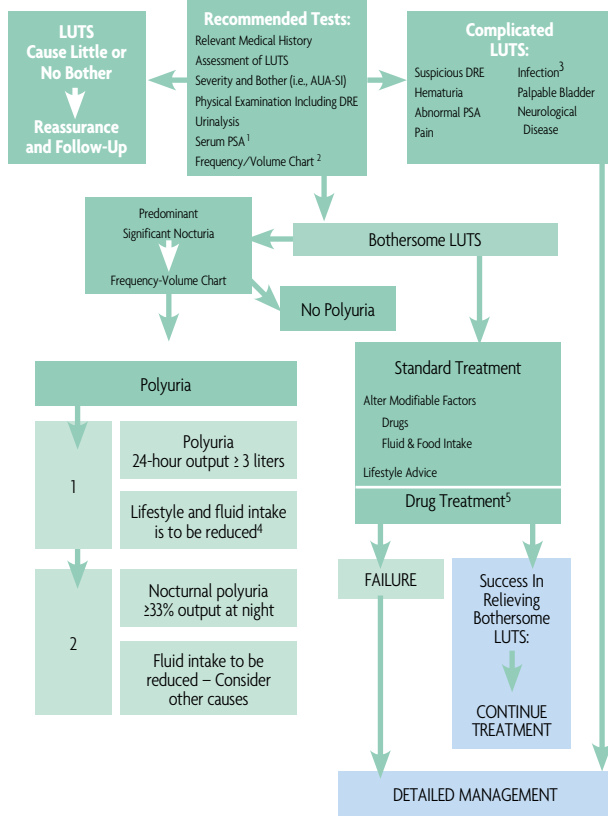
- Transurethral Incision of the Prostate (TUIP)
 - ◆ When prostate is less than 30mL in size
- Transurethral Electro vaporization of the Prostate (TUVP)
- Transurethral Resection of the Prostate (TURP)

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.

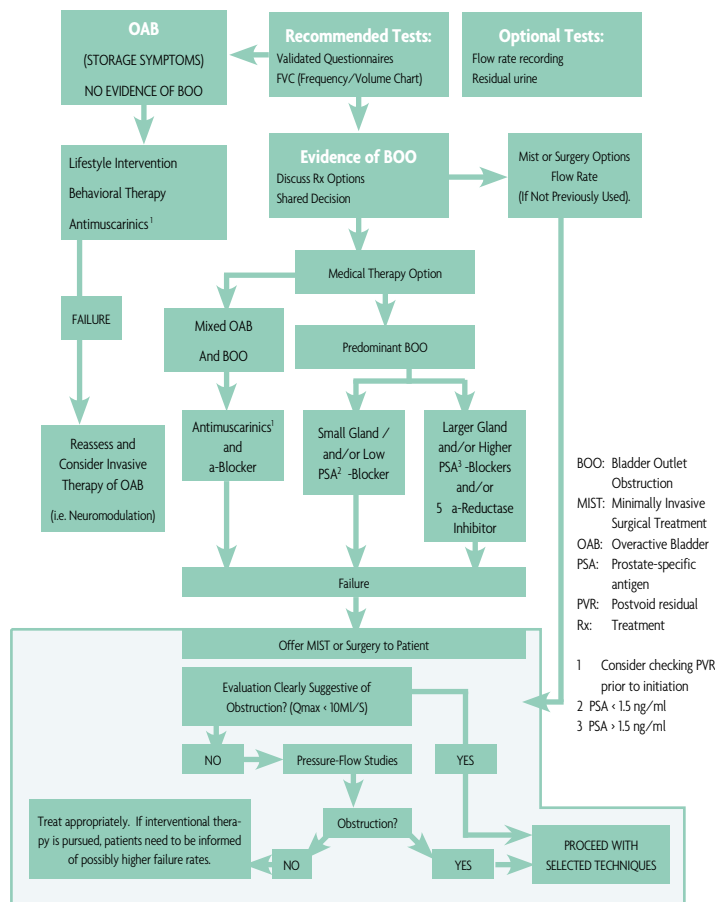
Basic Management of LUTS in Men



- 1 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.
- 2 When significant nocturia is a predominant symptom.
- 3 Assess and start treatment before referral.
- 4 In practice, advise patients with symptoms to aim for a urine output of about 1 liter/24 hours
- 5 See Figure 2

FIGURE 2.

Detailed Management for Persistent Bothersome LUTS after Basic Management



- BOO: Bladder Outlet Obstruction
 MIST: Minimally Invasive Surgical Treatment
 OAB: Overactive Bladder
 PSA: Prostate-specific antigen
 PVR: Postvoid residual
 Rx: Treatment
- 1 Consider checking PVR prior to initiation
 - 2 PSA < 15 ng/ml
 - 3 PSA > 15 ng/ml

TABLE 1.1

Treatment alternatives for patients with moderate to severe symptoms of BPH

Watchful Waiting	
Medical Therapies	Alpha-Blockers Alfuzosin Doxazosin Tamsulosin Terazosin Silodosin* 5-Alpha-reductase inhibitors (5-ARIs) Dutasteride Finasteride Combination Therapy Alpha blocker and 5-alpha-reductase inhibitor Alpha blocker and anticholinergics Anticholinergic Agents
Complementary and Alternative Medicines (CAM)	
Minimally-invasive Therapies	Transurethral needle ablation (TUNA) Transurethral microwave thermotherapy (TUMT)
Surgical Therapies	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)

*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.

MANAGEMENT OF NONMUSCLE INVASIVE BLADDER CANCER Guideline (2007)

Staging
 Grade Classification
 Treatment Alternatives
 Patient Management

Table 1. Staging of Primary Tumors (T) in Bladder Cancer
 Table 2. 2004 World Health Organization/ International Society of Urologic Pathologists: Classification of Nonmuscle Invasive Urothelial Neoplasia

When initially diagnosed, most bladder cancers are nonmuscle invasive transitional cell carcinomas, either confined to the mucosa or invading the lamina propria but not the detrusor muscle. The present recommendations apply to the management of patients with these nonmuscle invasive cancers that include stages Ta, T1 and Tis (carcinoma in situ) bladder cancer. Inherent in the guideline is the importance of individualizing patient diagnostic evaluation and therapy. Specific index patients as defined in the guideline and described below will assist in determining appropriate management.

Staging

- Staging is divided into clinical (the histologic findings at transurethral resection of bladder tumor (TURBT), findings of the physical exam, and radiology) and pathological (the

extent of disease following surgical resection of the bladder and adjacent lymph nodes). Table 1 shows the tumor, node and metastasis classifications. Under this system, nonmuscle invasive bladder cancer includes:

- ◆ **Stage Ta tumors** - papillary tumors confined to the epithelial mucosa.
- ◆ **Stage T1 tumors** - papillary or nodular tumors penetrate the basement membrane into the subepithelial connective tissue (lamina propria) and have a greater risk of progression than Ta tumors, most commonly high grade.
- ◆ **CIS (stage Tis) tumors** - high-grade tumors that may appear as flat erythematous or “velvety” lesions of the mucosa or may be occult; not always readily visualized on standard cystoscopy. Oftentimes occur in association with high-grade nodular tumors.

Grade Classification

- Tumor grade is one of the most important prognostic indicators of potential for disease recurrence and progression. In 2004, members of the World Health Organization (WHO) and the International Society of Urologic Pathologists published and recommended a revised consensus classification for papillary neoplasms. Previous Grade 2 lesions (based on WHO 1973) are now classified as either low grade or high grade (Table 2).

Treatment Alternatives

- In most cases nonmuscle invasive bladder cancer is treated initially with TURBT. TURBT provides histologic assessment

of tumor type, grade, and depth of invasion (stage). Repeat TURBT may improve staging accuracy and local control of disease. Complete eradication of all visible tumors when feasible is accomplished by either resection and/or fulguration.

- A single dose of chemotherapy may be administered immediately in the perioperative period following TURBT to reduce the risk of recurrence. In addition, adjuvant intravesical immunotherapy or chemotherapy can be used following TURBT (with or without maintenance therapy) to prevent disease recurrence and, in the case of BCG, possibly disease progression. Depending on the patient and tumor characteristics, a number of patients may benefit from some form of intravesical therapy. The most commonly used agents are bacillus Calmette-Guérin (BCG) and mitomycin C but there is little evidence defining and confirming the optimal dose, number of doses, and timing. Laser ablation may be utilized as secondary treatment in certain settings.
- Certain patients with low-risk tumors may be managed conservatively with office fulguration of the lesions or even cystoscopic surveillance.

Patient Management

For all patients

- Present and discuss the treatment options and benefits and harms, including side effects, of intravesical treatment.

For patients with abnormal urothelial growth not yet diagnosed

- Obtain a biopsy if the patient does not have an established histologic diagnosis.
- Completely eradicate all visible tumors under most circumstances. Size, multiplicity of tumors, invasion of the muscle and comorbid conditions must be considered before resection. Electrocautery, fulguration or laser energy can be used.
- Perform periodic surveillance cystoscopy for confirmed bladder cancer. A risk-adapted approach should dictate interval and duration of follow-up.
- Consider an initial single dose of intravesical chemotherapy immediately postoperatively if the tumor appears to be papillary (Ta) and there are no contraindications such as perforation.

For patients with small volume, low-grade Ta bladder cancer

- An initial single dose of intravesical chemotherapy may be administered immediately postoperatively. There is no evidence that multiple doses of either BCG or chemotherapy have additional benefit.

For patients with multifocal and/or large volume, histologically confirmed, low-grade Ta, or recurrent low-grade Ta bladder cancer

- Treat with an induction course of intravesical therapy with BCG or mitomycin C with the goal of preventing or delaying recurrence.
- Consider maintenance BCG or mitomycin C as they are more effective in decreasing recurrences when compared

to induction alone. The side effects and cost of treatment may outweigh the benefits and are important to discuss with the patient before beginning or continuing therapy. Optimal schedule and duration have not yet been determined but the Southwest Oncology Group regimen can be used (i.e., a 6-week BCG induction followed by 3-week maintenance at 3, 6, 12, 18, 24, 30 and 36 months if tolerated).

For patients with initial histologically confirmed high-grade Ta, T1, and/or carcinoma in situ

- Repeat resection should be performed prior to additional intravesical therapy in patients with lamina propria invasion (T1) but without muscularis propria in the specimen, to increase the accuracy of clinical staging.
- Administer an induction course of BCG followed by maintenance therapy. Because the side effects and costs of treatment may outweigh benefits, discuss treatment with the patient before beginning or continuing therapy.
- Cystectomy should be considered for initial therapy in select patients because of the risk of understaged muscle invasive disease or progression to muscle invasive disease. Because cystectomy is not without complications and morbidity, discuss these issues with the patient who is contemplating bladder removal.

For patients with high-grade Ta, T1 and/or carcinoma in situ cancer which has recurred after prior intravesical therapy

- Perform a repeat resection prior to additional intravesical

therapy in patients with lamina propria invasion (T1) but without muscularis propria in the specimen. Accurate clinical staging is crucial.

- Consider cystectomy as a therapeutic alternative as there is substantial risk of progression to muscle invasive cancer.
- Consider further intravesical therapy as select patients will respond to a second induction regimen particularly with BCG, although in patients at high risk for progression, further intravesical therapy places the patient at risk for muscle invasion and/or metastasis.

TABLE 1.

Staging of Primary Tumors (T) in Bladder Cancer

Tx:	Primary tumor cannot be assessed
Ta:	Noninvasive papillary carcinoma
Tis:	Carcinoma in situ
T1:	Tumor invades lamina propria
T2:	Tumor invades muscularis propria
T2a:	Invades superficial muscularis propria (inner half)
T2b:	Invades deep muscularis propria (outer half)
T3:	Tumor invades perivesical tissue/fat
T3a:	Invades perivesical tissue/fat microscopically
T3b:	Invades perivesical tissue fat macroscopically (extravesical mass)
T4:	Tumor invades prostate, uterus, vagina, pelvic wall, or abdominal wall
T4a:	Invades adjacent organs (uterus, ovaries, prostate stoma)
T4b:	Invades pelvic wall and/or abdominal wall

Adapted from the American Joint Committee on Cancer Staging Manual (Greene, 2002).

TABLE 2.

2004 World Health Organization/ International Society of Urologic Pathologists: Classification of Nonmuscle Invasive Urothelial Neoplasia

Hyperplasia (flat and papillary)	Reactive atypia
Atypia of unknown significance	Urothelial dysplasia
Urothelial carcinoma in situ	Urothelial papilloma
Papillary urothelial neoplasm of low malignant potential	Nonmuscle invasive low-grade papillary urothelial carcinoma
Nonmuscle invasive high-grade papillary urothelial carcinoma	

Adapted from World Health Organization Classification of Tumours: Pathology and Genetics of Tumours of the Urinary and Male Genital Organs (Eble, 2004).

MANAGEMENT OF ERECTILE DYSFUNCTION

Guideline (2005)

Diagnostic Evaluation of Erectile Dysfunction
Initial Management and Discussion of Treatment Options with
the Patient

Treatment Recommendations

TABLE 1. Treatment Options for Patients with Erectile
Dysfunction

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, atherosclerosis 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

PREVENTION OF DEEP VEIN THROMBOSIS IN PATIENTS UNDERGOING UROLOGIC SURGERY

Best Practice Statement (2008)

Assessing Patient Risk

For patients undergoing transurethral surgery

For patients undergoing anti-incontinence and pelvic reconstructive surgery

For patients undergoing open urologic surgery

FDA warnings

Table 1: Risk Factors for Increased Development of Deep Vein Thrombosis

Table 2: Patient Risk Stratification

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

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)

* 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

INTERSTITIAL CYSTITIS/ BLADDER PAIN SYNDROME (IC/BPS)

Guideline (2011)

Evaluation and Diagnosis of IC/BPS
Strategies for the Treatment of IC/BPS
Treatments that may be offered
Treatments that should not be offered

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.

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. Each statement is linked to the body of evidence strength and the Panel's judgment regarding the balance between benefits and risks/burdens. Please refer to the full Guideline for the grades of individual statements.

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 (see text for details).
- 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 re-assessment 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 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. 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

- 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.
- 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.

Sixth-line treatment

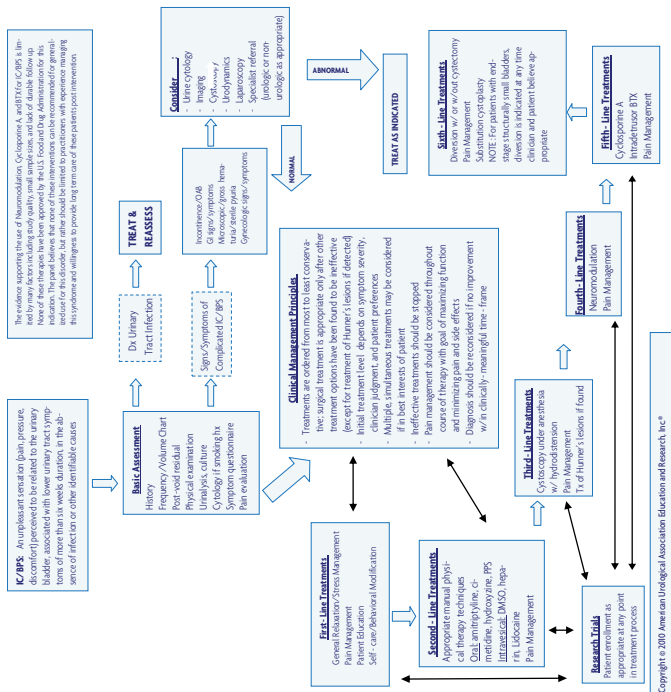
- Major surgery (e.g., substitution cystoplasty, urinary diversion with or without cystectomy) may be undertaken in carefully selected patients for whom all other therapies have failed to provide adequate symptom control and quality of life.

Treatments that should not be offered

The treatments below appear to lack efficacy and/or appear to be accompanied by unacceptable adverse event 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.

- Intravesical instillation of resiniferatoxin should not be offered.
- High-pressure, long-duration hydrodistension should not be offered.
- Systemic (oral) long-term glucocorticoid administration should not be offered.



OPTIMAL EVALUATION OF THE INFERTILE MALE

Best Practice Statement (2010)

Table 1. Semen Analysis: Reference Values

TABLE 2. Endocrine Evaluation: The Relationship of Testosterone, LH, FSH and Prolactin with Clinical Condition

TABLE 3. Obstructive Azospermia: Sperm Retrieval Techniques

EVALUATION OF AZOOSPERMIC MALE Best Practice Statement (2010)

MANAGEMENT OF OBSTRUCTIVE AZOOSPERMIA Best Practice Statement (2010)

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 off-

spring 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 non-prescription) 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 agenesis 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 non-obstructive 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 (2010)

- 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 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:

- ◆ a testicular biopsy to confirm obstruction,
- ◆ TRUS with or without seminal vesicle aspiration and seminal vesiculography to identify obstruction in the distal male reproductive tract,
- ◆ alternatively, vasography to identify the site of reproductive tract obstruction but not unless reconstructive surgery is undertaken at the same surgical procedure.

MANAGEMENT OF OBSTRUCTIVE AZOOSPERMIA

Best Practice Statement (2010)

- 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)

*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/	High	High	Low	Normal
Prolactin-secreting pituitary tumor	Normal/Low	Normal/Low	Low	High

* 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

MANAGEMENT OF VARICOCELE AND INFERTILITY

Best Practice Statement (2001)

TABLE 1. Semen Analysis: Reference Values

Table 2. Endocrine Evaluation of Infertility

- 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)

*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

* 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.

PHARMACOLOGIC MANAGEMENT OF PREMATURE EJACULATION

Guideline (2004)

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

Patient Management

Medical Treatment

TABLE 1. Medical Therapy Options for the Treatment of Premature Ejaculation*

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

* 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.

MANAGEMENT OF PRIAPISM

Guideline (2003)

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

Management of Priapism

Table 1. Key Findings in the Evaluation of Priapism

Table 2. Typical Blood Gas Values

Figure 1. Management of Priapism

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 cavern-

ous 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 $\mu\text{g}/\text{mL}$. 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 anti-androgens 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	■	◆

• Usually present; ◆ Sometimes present; ■ Seldom present

TABLE 2.

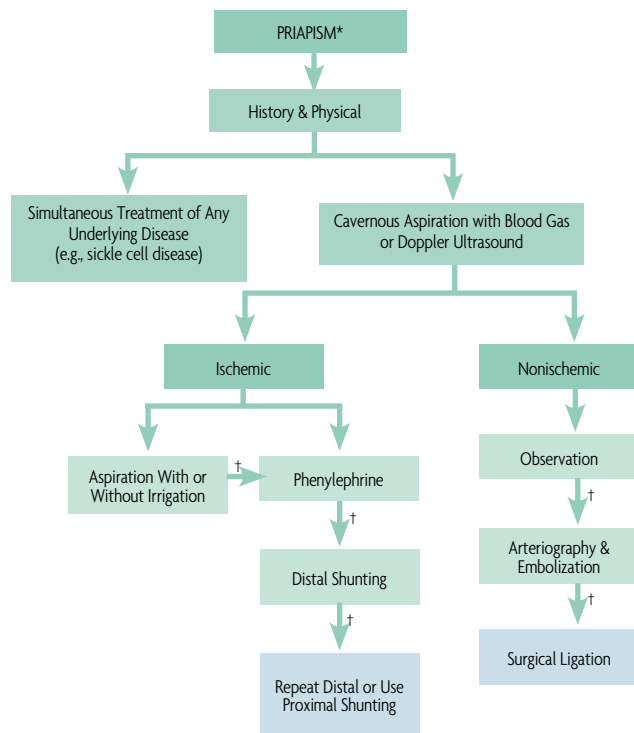
Typical Blood Gas Values

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

*Broderick & Harkaway, 1994.

FIGURE 1.

Management of Priapism



* Erection greater than 4 hours duration.

† Proceed upon treatment failure.

MANAGEMENT OF CLINICALLY LOCALIZED PROSTATE CANCER

Guideline (2007)

This Guideline provides recommendations for the management of the contemporary man whose tumor is clinically localized stage T1 (normal digital rectal examination [DRE]) or T2 (abnormal DRE but no evidence of disease beyond the confines of the prostate) with no evidence of spread to regional lymph nodes (N0 or NX) or evidence of metastatic spread (M0).

Initial Evaluation

Treatment Recommendations

Treatment of the Low-risk Patient, defined as PSA ≤ 10 ng/mL, Gleason score ≤ 6 and clinical stage T1c or T2a

Treatment of the Intermediate-risk Patient, defined as PSA >10 to 20 ng/mL or a Gleason score of 7 or clinical stage T2b but not qualifying for high risk

Treatment of the High-risk Patient, defined as PSA >20 ng/mL or a Gleason score of 8 to 10 or clinical stage T2c

Additional Treatment Guidelines

Treatment Complications

FIGURE 1. Rate of Complications Reported with External Beam Radiotherapy*

FIGURE 2. Rate of Complications Reported With Interstitial Prostate Brachytherapy*

FIGURE 3. Rate of Complications Reported With Radical Prostatectomy*

Initial Evaluation

- Assess the following prior to treatment decisions:
 - ◆ Patient's life expectancy
 - With relatively long life expectancy, localized prostate

cancer can be a cause of morbidity and mortality.

- At an advanced age or with a relative short life expectancy, the chance of disease progression or death from prostate cancer is reduced.
- ✦ Patient's overall health status
 - Overall health status influences life expectancy and may affect patient response to adverse events resulting from a particular intervention.
 - Urinary, sexual and bowel functions are important treatment determinants.
- ✦ Patient's tumor characteristics
 - PSA level, velocity and doubling time, Gleason score and tumor stage are predictive of cancer outcomes.

Treatment Recommendations

- Inform patients about and discuss the estimates for the benefits and harms of commonly accepted initial interventions, including, at a minimum, active surveillance, external beam and interstitial radiotherapy, and radical prostatectomy.

Treatment of the Low-risk Patient, defined as PSA ≤ 10 ng/mL, Gleason score ≤ 6 and clinical stage T1c or T2a

- Active surveillance, interstitial prostate brachytherapy, external beam radiotherapy and radical prostatectomy are appropriate treatment options. Study outcomes data do not provide clear-cut evidence for the superiority of any one treatment.
- Consider patient preferences and functional status related to urinary, sexual and bowel function in decision making. Particular treatments have the potential to improve, to

worsen, or to have no effect on health conditions making no one treatment preferable for all patients.

- Consider the following when counseling patients regarding treatment options:
 - ✦ Two randomized controlled clinical trials show that higher dose radiation may decrease the risk of PSA recurrence; and
 - ✦ Based on outcomes of one randomized controlled clinical trial, when watchful waiting and radical prostatectomy are compared, radical prostatectomy may be associated with a lower risk of cancer recurrence, cancer-related death and improved survival.
- Inform patients who are considering specific treatment options of the findings of recent high-quality clinical trials, including that:
 - ✦ For those considering external beam radiotherapy, higher dose radiation may decrease the risk of PSA recurrence.
 - ✦ When compared with watchful waiting, radical prostatectomy may lower the risk of cancer recurrence and improve survival.
- Determine the aim of second-line therapy (curative or palliative) for patients choosing active surveillance and tailor follow-up accordingly.

Treatment of the Intermediate-risk Patient, defined as PSA >10 to 20 ng/mL or a Gleason score of 7 or clinical stage T2b but not qualifying for high risk

- Active surveillance, interstitial prostate brachytherapy, external beam radiotherapy and radical prostatectomy are appropriate treatment options. Study outcomes data do

not provide clear-cut evidence for the superiority of any one treatment.

- ◆ Consider patient preferences and functional status related to urinary, sexual and bowel function in decision making.
- Consider the following when counseling patients regarding treatment options:
 - ◆ Based on outcomes of one randomized controlled clinical trial, the use of neoadjuvant and concurrent hormonal therapy for a total of six months may prolong survival in the patient who has opted for conventional external beam radiotherapy;
 - ◆ based on outcomes of one randomized controlled clinical trial, when watchful waiting and radical prostatectomy are compared, radical prostatectomy may be associated with a lower risk of cancer recurrence, cancer-related death and improved survival; and
 - ◆ based on outcomes of two randomized controlled clinical trials, higher dose radiation may decrease the risk of PSA recurrence.
- Inform patients who are considering specific treatment options of the findings of recent high-quality clinical trials, including that:
 - ◆ For those considering external beam radiotherapy, the use of hormonal therapy combined with conventional dose radiotherapy may prolong survival.
 - ◆ When compared with watchful waiting, radical prostatectomy may lower the risk of cancer recurrence and improve survival.
 - ◆ For those considering external beam radiotherapy, higher dose radiation may decrease the risk of PSA recurrence.
- Determine the aim of second-line therapy (curative or pal-

liative) for patients choosing active surveillance and tailor follow-up accordingly.

Treatment of the High-risk Patient, defined as PSA >20 ng/mL or a Gleason score of 8 to 10 or clinical stage T2c

- Although active surveillance, interstitial prostate brachytherapy, external beam radiotherapy and radical prostatectomy are treatment options, recurrence rates are high. Study outcomes data do not provide clear-cut evidence for the superiority of any one treatment.
- Consider the following when counseling patients regarding treatment options:
 - ◆ based on outcomes of one randomized controlled clinical trial, when watchful waiting and radical prostatectomy are compared, radical prostatectomy may be associated with a lower risk of cancer recurrence, cancer-related death and improved survival; and
 - ◆ based on results of two randomized controlled clinical trials, the use of adjuvant and concurrent hormonal therapy may prolong survival in the patient who has opted for radiotherapy.
- Inform high-risk patients who are considering specific treatment options of the findings of recent high-quality clinical trials, including that:
 - ◆ When compared with watchful waiting, radical prostatectomy may lower the risk of cancer recurrence and improve survival.
 - ◆ For those considering external beam radiotherapy, use of hormonal therapy combined with conventional radiotherapy may prolong survival.

- Active treatment may be a preferred option because of a high risk of disease progression and death from disease.
- All treatments chosen for high-risk patients (non-nerve-sparing prostatectomy, higher dose radiation or radiation combined with hormonal therapy) are associated with a high risk of erectile dysfunction.

Additional Treatment Guidelines

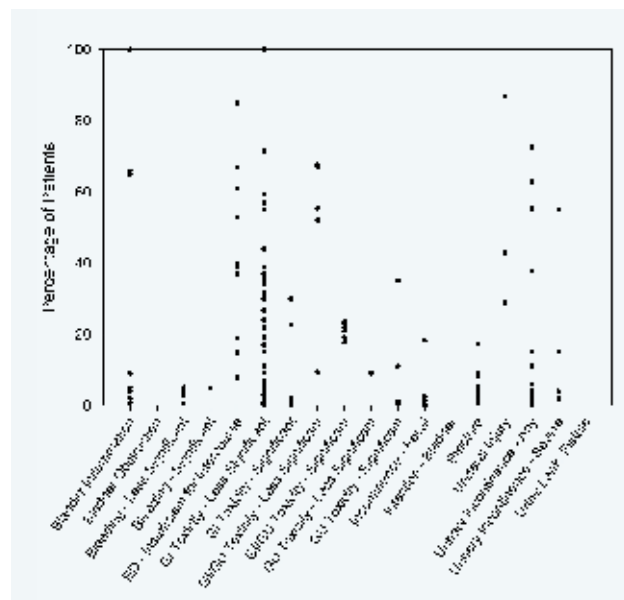
- Offer patients the opportunity to enroll in clinical trials examining new forms of therapy, including combination therapies, with the goal of improved outcomes.
- First-line hormone therapy is seldom indicated in patients with localized prostate cancer. An exception may be for/in:
 - ◆ palliation of symptomatic patients with more extensive or poorly differentiated tumors whose life expectancies are too short to benefit from treatment with curative intent. The morbidities of androgen deprivation therapy (ADT) should be considered in the context of the existing comorbidities of the patient when choosing palliative ADT.

Treatment Complications

Figures 1, 2 and 3 show the variability of complication rates for external beam radiotherapy, interstitial prostate brachytherapy and radical prostatectomy. Each circle on a graph represents one series reporting the complication. The graphs simply show the highest rate reported, disregarding the timing and neither the size of each series nor the confidence interval for the indicated percentage is indicated.

FIGURE 1.

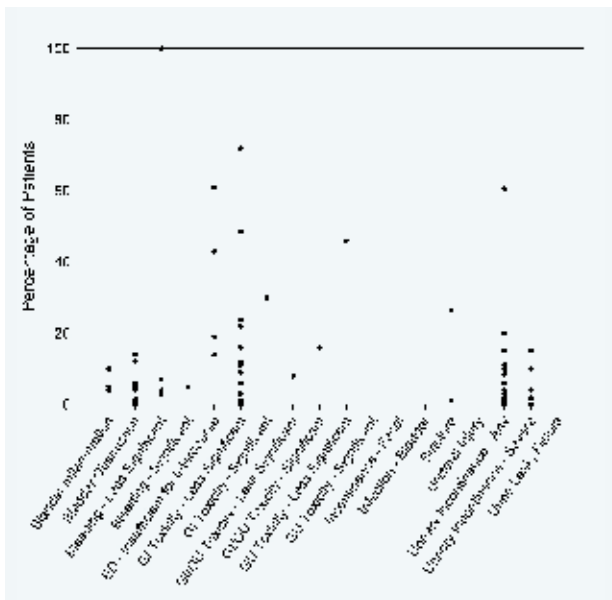
Rate of Complications Reported with External Beam Radiotherapy*



* For some complications, no data were available. ED, erectile dysfunction; GI, gastrointestinal; GU, genitourinary.

FIGURE 2.

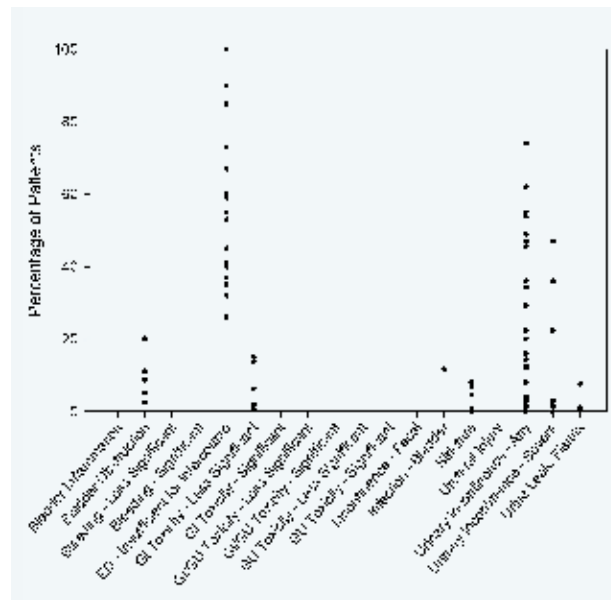
Rate of Complications Reported With Interstitial Prostate Brachytherapy*



* For some complications, no data were available. ED, erectile dysfunction; GI, gastrointestinal; GU, genitourinary.

FIGURE 3.

Rate of Complications Reported With Radical Prostatectomy*



* For some complications, no data were available. ED, erectile dysfunction; GI, gastrointestinal; GU, genitourinary.

PROSTATE-SPECIFIC ANTIGEN (PSA)

Best Practice Statement (2009)

About the PSA Test

Using the PSA Test to Assess Prostate Cancer Risk

PSA Interpretation

Considerations

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

Radiographic Considerations

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

Figure 1. Early Detection

Figure 2. Staging—Once Prostate Cancer is Diagnosed

Figure 3. Posttreatment Assessment and Management

The prostate-specific antigen (PSA) test plays many important roles in the early detection and diagnosis of prostate cancer. PSA testing is a measure to characterize and assess risk of prostate cancer and, if cancer is detected, to develop treatment recommendations. The AUA updated its Best Practice Statement on PSA in 2009; this document outlines the use of PSA in the early detection and pre-treatment staging of prostate cancer and in identification of biochemical recurrence following treatment.

Early detection remains controversial. The AUA feels that prostate cancer testing (with both a PSA test and a digital rectal exam, also known as DRE) is an individual decision that patients should make together with their doctor. There is no single standard that applies to all men.

About the PSA Test

- Men who wish to be screened for prostate cancer should

have both a PSA test and a DRE. However, DRE may be a barrier to testing in some men. If so, a PSA alone is better than no testing.

- Assess patient's health status to determine appropriateness of PSA testing at any age.
 - ◆ The benefits of screening men over age 75 decline rapidly with age, but may be warranted if someone is in excellent health, without comorbidities and with family longevity and may be at high risk of clinically significant cancer based on those factors noted below.
- Family history, race, PSA history, prior biopsy, health status, and comorbidities can impact a man's risk of developing prostate cancer.
- Among men in their 40's and 50's, a baseline PSA level above the median value for age is a stronger predictor of future risk of prostate cancer than family history or race.
- Several factors such as prostatitis, BPH, urethra or prostatic trauma, prostate cancer, surgical or medical castration, use of finasteride or dutasteride, and prostate biopsy (postpone PSA testing for three to six weeks) can affect PSA levels.

Using the PSA Test to Assess Prostate Cancer Risk

- Offer early detection and risk assessment using PSA and DRE to healthy, well-informed men 40 years of age or older who wish to be screened and who have at least a 10-year life expectancy (Figure 1).
- Shared decision making, between doctor and patient,

should occur before early detection is undertaken. Patients should be counseled about the risks and benefits of prostate cancer screening.

- ◆ Risks: Routine PSA testing overdetects smaller volume lower grade tumors. PSA tends to increase with age. The use of higher "normal" levels for older men results in fewer biopsies but may also increase the risk of missing high grade cancers in older men.
- ◆ Benefits: Obtaining a more accurate baseline number ideally beginning at age 40, (with results not confounded by chance of an enlarged prostate common to older men) with periodic follow-up, may help reduce mortality.
- Determine future screening intervals based upon PSA number. Men in their 40s with a PSA value above the median (0.6 to 0.7 ng/ml) are at higher risk for prostate cancer.
- Confirm abnormal PSA value before proceeding to biopsy.

PSA Interpretation

- There is no safe PSA value below which a man may be reassured that he does not have biopsy-detectable prostate cancer.
- Higher age, African American ethnicity, and family history of prostate cancer increase the risk of prostate cancer for a given level of PSA.
- Part of informed consent is giving patients as much information about their personal risk as is available. Applying population-based cut points while ignoring other individual risk

factors (e.g., age, ethnicity, family history, previous biopsy characteristics) may not give a patient the most optimal assessment of his risk, including the risk of high grade disease.

No universally accepted definition of clinically significant or insignificant prostate cancer currently exists. Previous studies have focused on measures such as cancer volume, stage, and histologic grade to assess this. Whether a cancer is significant or insignificant may be determined by assessing cancer volume, stage and histologic grade, as well by the number of biopsies showing cancer and the extent of cancer in individual cores. No currently available noninvasive imaging method can consistently and reliably measure tumor volume.

- Risk assessment tools (i.e., nomograms, probability tables, on-line risk assessment calculators) can be used to help determine the likelihood of pathologic outcomes and recurrence-free survival after treatment.

Considerations

PSA sensitivity and specificity

- For comparison, age-specific, median PSA values are 0.7 ng/ml for men in their 40's, 0.9ng/ml for men in their 50's, 1.2 for men in their 60's, and 1.5 for men in their 70's.
- PSA testing in patients with a serum PSA level above 4.0 ng/ml has a sensitivity of about 20% in contemporary series. The specificity of PSA testing is approximately 60%

to 70% at this cutoff. One way to improve is to use a lower threshold value for all men. Another is to decrease the "threshold" PSA level to a lower value for younger men (age-specific or age-adjusted PSA). Cancer-free men are most likely to have a serum PSA value of 2.5 ng/ml or less.

- Assessing PSA kinetics, PSA doubling time (PSADT) or PSA velocity (PSAV) are also used to determine cancer risk and aggressiveness. However, not all studies confirm their usefulness
- PSA rise of 0.75 ng/ml or greater in a year may signal concern in patients with a PSA level >4.0 ng/ml.
- PSAV of 0.75 ng/ml per year is recommended for men with PSA values between 4-10 ng/ml, but lower PSAV thresholds of 0.4 ng/ml per year may improve prostate cancer detection for younger men and those with PSA levels below 4.0 ng/ml.
- Age-adjusted PSAV with threshold values of 0.25 ng/ml/yr in men ages 40 to 59, 0.5 ng/ml/year in men ages 60 to 69, and 0.75 ng/ml/year for men over 70 years of age are options.
- Age-specific PSA and age-specific PSAV will increase the number of cancers detected, and both will also increase the number of younger men undergoing biopsy. However, when added to total PSA, PSAV was not shown to be a useful independent predictor of positive biopsy in certain studies.
- To correctly measure PSAV, use of at least three PSA values over a time period of at least 18 months is recommended.

- Other methods include free/total PSA ratio.
- The use of risk assessment tools such as nomograms and risk calculators, and incorporating multiple variables, are also used to determine the need for biopsy.

Confirm presence of cancer with biopsy if:

- ◆ Elevated PSA and abnormal DRE are found.
- ◆ No “safe” PSA value but rather, a continuum of risk.
- ◆ Account for multiple factors, including free and total PSA, patient age, PSA velocity, PSA density, family history, ethnicity, prior biopsy history and comorbidities.

Considerations

- Chemoprevention should be considered for men who are disease free but at increased risk of prostate cancer.
- The option of active surveillance in lieu of immediate treatment should be considered for men diagnosed with prostate cancer.
- Many prostate cancers in men over age 75 may not require treatment. Treatment of higher-risk cancer (high grade or stage) in an older man who is otherwise in good health may reduce risk of morbidity or mortality from the disease.
- Future screening intervals should be determined by baseline PSA level and individual preference.

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

PSA level and rate of rise 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 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 (Figure 2).

- 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 low risk patients with clinically localized prostate cancer if PSA is less than 10.0 ng/ml and the Gleason score is less than or equal to 6.
 - ◆ 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 (Figure 3).

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 ≥ 0.2 ng/ml followed by a subsequent confirmatory PSA value ≥ 0.2 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 radiotherapy.
 - ◆ A PSA level of < 7.0 nl/ml at five years is reasonable for brachytherapy.
 - ◆ PSA levels may continue to decline more than five years after interstitial prostate brachytherapy.

PSA nadir after androgen suppression:

- PSA kinetics correlate 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.
 - ◆ Differentiating local from distant relapse may be facilitated by assessing initial pathological stage, margin status, time to recurrence and postoperative PSA kinetics.
 - ◆ 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 not 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 1.

Early Detection

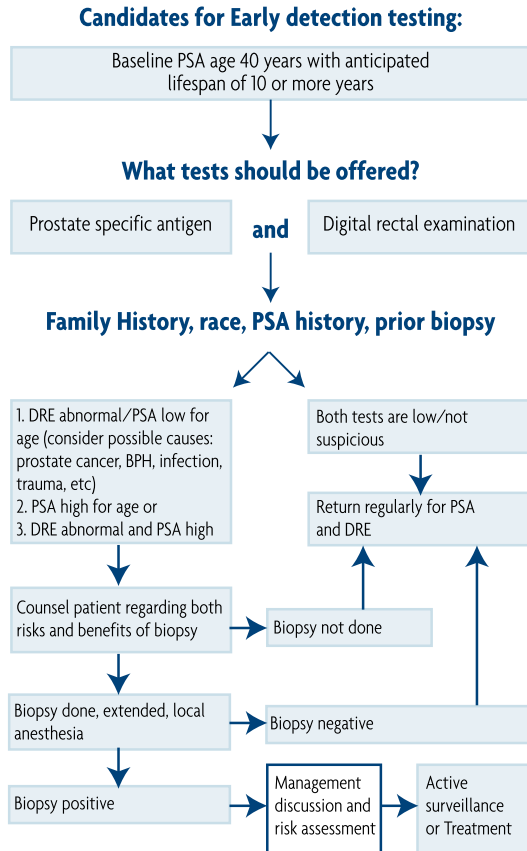


FIGURE 2.

Staging—Once Prostate Cancer is Diagnosed

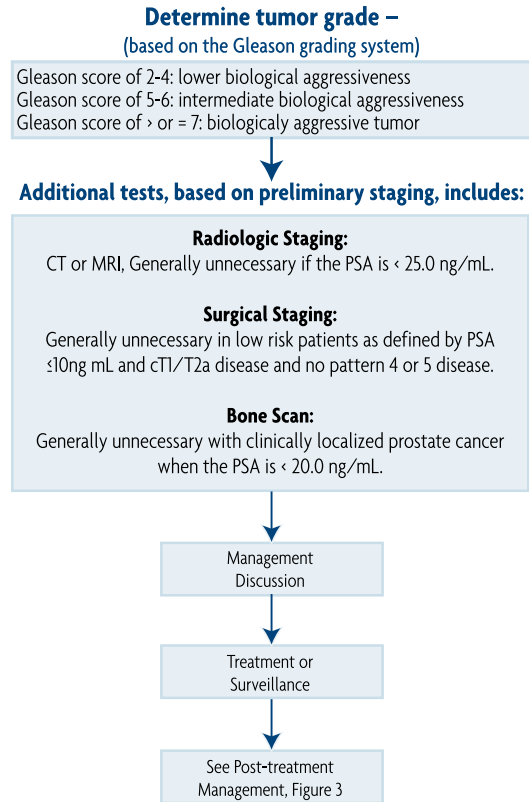
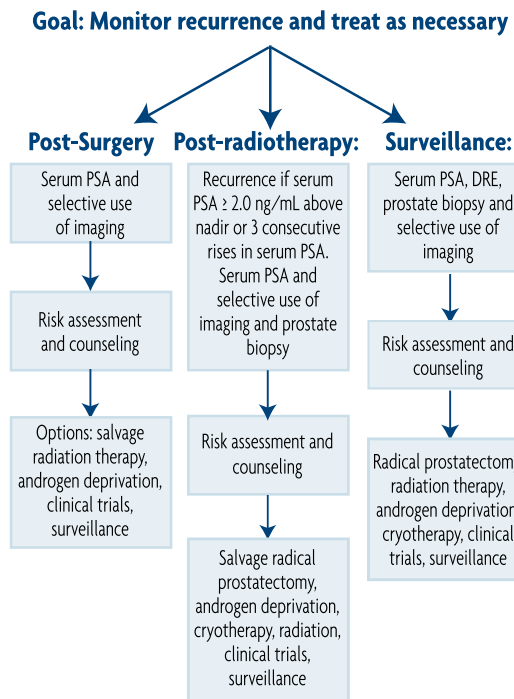


FIGURE 3.

Posttreatment Assessment and Management



MANAGEMENT OF CLINICAL T1 RENAL MASS

Guideline (2009)

- Overview
- Principles of Management
- Counseling
- AUA Guidelines Consensus Statements
- Algorithm for Management

Overview

- Clinical T1 (< 7.0 cm) renal masses are frequently encountered (approximately 30-40,000 cases per year in the U.S.)
- Approximately 20% are benign, 60% appear to be relatively indolent renal cell carcinoma (RCC), and only about 20% demonstrate potentially aggressive histologic features.
- Management options include radical nephrectomy (RN), partial nephrectomy (PN), thermal ablation (TA), and active surveillance (AS).

Principles of Management

- Oncologic control is the main priority, because 20% of these tumors are potentially aggressive, local salvage can be difficult, and systemic disease is still lethal in the overwhelming majority of cases.
 - ◆ Nephron-sparing approaches should be utilized whenever possible.
 - ◆ Morbidity should be minimized whenever feasible.

Evaluation

- High quality cross-sectional imaging study (CT or MRI) with

and without contrast (in the presence of adequate renal function) to assess for contrast enhancement,

- ♦ exclude angiomyolipoma (AML),
- ♦ assess for locally invasive features,
- ♦ define the relevant anatomy, and
- ♦ evaluate the status of the contralateral kidney.

- Percutaneous renal mass core biopsy with or without fine needle aspiration (FNA) for patients in whom it might impact management.
 - ♦ Particularly patients with clinical or radiographic findings suggestive of lymphoma, abscess or metastasis.

Counseling

- Review the current understanding of the natural history of clinical T1 renal masses, the relative risks of benign vs. malignant pathology and the potential role of active surveillance (AS).
- Review the available treatment options and the attendant benefits and risks, including:
 - ♦ oncologic considerations,
 - ♦ renal functional considerations and
 - ♦ potential morbidities.
- Discuss the potential advantages of a nephron-sparing treatment approach in the imperative and elective settings, including:
 - ♦ the avoidance of dialysis and
 - ♦ reduced risk of chronic kidney disease with its attendant morbidity and mortality.

AUA Guidelines Consensus Statements

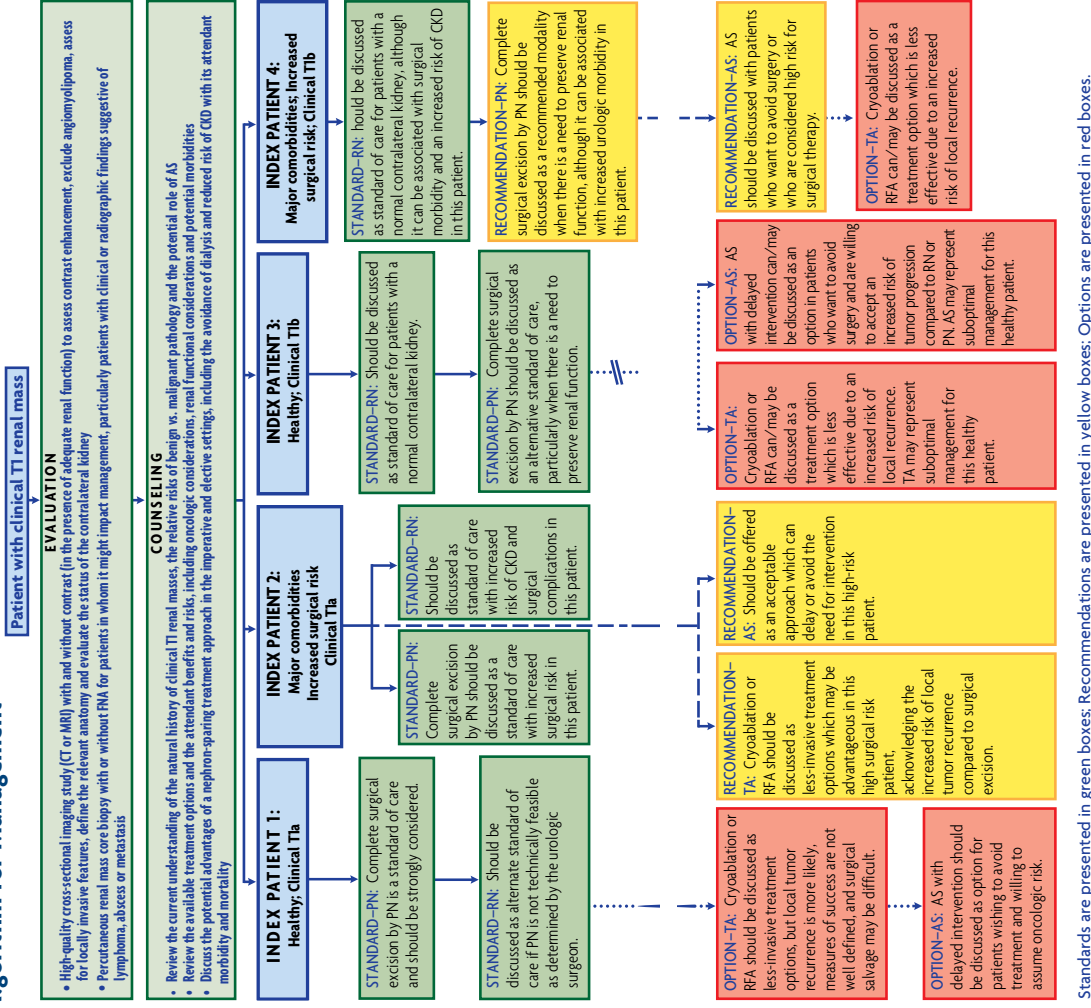
Adapted from Campbell et al, J Urology, in press, October, 2009

Partial Nephrectomy (PN): Surgical excision by PN is a reference standard for the management of clinical T1 renal masses, whether for imperative or elective indications, given the importance of preservation of renal parenchyma and avoidance of chronic kidney disease (CKD). This treatment modality is greatly underutilized. PN has well established longitudinal oncologic outcomes data comparable to RN. Adequate expertise and careful patient selection are important

Radical Nephrectomy (RN): RN, particularly laparoscopic RN, is greatly overutilized. Nephron-sparing approaches should be considered in all patients with a clinical T1 renal mass as an overriding principle, presuming adequate oncologic control can be achieved, based on compelling data demonstrating an increased risk of chronic kidney disease (CKD) associated with RN and a direct correlation between CKD and morbid cardiovascular events and mortality on a longitudinal basis. RN is still a viable option when necessary based on tumor size, location or radiographic appearance if the surgeon judges that nephron-sparing surgery is not feasible or advisable.

Thermal ablation (TA): TA (cryoablation or radiofrequency ablation [RFA]), either percutaneous or laparoscopic, is an available treatment option for the patient at high surgical risk who wants active treatment and accepts the need for long-term radiographic surveillance after treatment. Counseling about TA should include

Algorithm for Management



Standards are presented in green boxes; Recommendations are presented in yellow boxes; Options are presented in red boxes.

Guideline Statement Key

- Standard: A guideline statement is a standard if: (1) the health outcomes of the alternative interventions are sufficiently well known to permit meaningful decisions, and (2) there is virtual unanimity about which intervention is preferred.
- Recommendation: A guideline statement is a recommendation if: (1) the health outcomes of the alternative interventions are sufficiently well known to permit meaningful decisions, and (2) an acceptable, but not unanimous majority agrees on which intervention is preferred.
- Option: A guideline statement is an option if: (1) the health outcomes of the interventions are not sufficiently well known to permit meaningful decisions, or (2) preferences are unknown or equivocal.

Key: AS, active surveillance; CKD, chronic kidney disease; CT, computed tomography; FNA, fine needle aspiration; MRI, magnetic resonance imaging; PN, partial nephrectomy; RFA, radiofrequency ablation; RN, radical nephrectomy; TA, thermal ablation

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a balanced discussion of the increased risk of local recurrence when compared to surgical excision, potential need for re-intervention, lack of well-proven radiographic parameters for success (particularly after RFA), potential for difficult surgical salvage if tumor progression is found and the lack of long-term outcomes data for TA patients. Larger tumors (> 3.5 cm) and those with an infiltrative appearance may be associated with increased risk of recurrence when managed with TA.

Active surveillance (AS): AS is a reasonable option for the management of localized renal masses that should be discussed with all patients and should be a primary consideration for patients with decreased life expectancy or extensive comorbidities that would make them high risk for intervention. Counseling about AS should include a balanced discussion of the small but real risk of cancer progression, lack of curative salvage therapies if metastases develop, possible loss of window of opportunity for nephron-sparing surgery (NSS) and lack of long-term outcomes data for AS patients. Larger tumors (> 3 to 4 cm) and those with aggressive appearance, such as infiltrative growth pattern, may be associated with increased risk and should be managed in a proactive manner.

MANAGEMENT OF STAGHORN CALCULI

Guideline (2005)

Management of Index Patients

Management of Non-index Patients

Staghorn calculi, which are usually composed of mixtures of magnesium ammonium phosphate (struvite) and/or calcium carbonate apatite, are branched stones that occupy a large portion of the collecting system typically filling the renal pelvis and branching into several or all of the calices. If left untreated, a staghorn stone eventually will destroy the kidney. Patients may experience recurrent urinary tract infection, sepsis and pain. In addition, the stone has a significant chance of causing death in affected patients. Complete stone removal is the therapeutic goal in order to eradicate any causative organisms, relieve obstruction, prevent further stone growth and associated infections and preserve kidney function.

A framework for the diagnosis and treatment of an index patient defined as follows is presented: an adult with a staghorn stone (non-cystine, non-uric acid) who has two relatively equally functioning kidneys or a solitary kidney with normal function, and whose overall medical condition, body habitus and anatomy permit performance of any of the four accepted active treatment modalities, including the use of anesthesia. In addition, several treatment options for non-index patients are discussed. The four active treatment modalities identified are percutaneous

nephrolithotomy (PNL) monotherapy; combinations of PNL and shock-wave lithotripsy (SWL); SWL monotherapy and open surgery (typically anatomic nephrolithotomy).

Management of Index Patients

- Inform newly diagnosed patients of the relative benefits and risks associated with each active treatment modality.
- Nonsurgical treatment with antibiotics, urease inhibitors and other supportive measures only, is not a viable alternative except in patients otherwise too ill to tolerate stone removal.

PNL Monotherapy

- PNL monotherapy is the treatment of choice except for patients with extremely large and/or complex stones.
- PNL allows removal of a high volume of stone as well as an accurate assessment of stone-free status.
- PNL results in superior stone-free rates compared to SWL and acceptably low morbidity compared to open surgery.

Combination PNL and SWL

- The mainstay of combination therapy is endoscopic removal.
- Percutaneous nephroscopy should be the last part of a combination therapy sequence as it allows for better assessment of stone-free status and a greater chance of achieving this state.

- Total removal of fragments from the collecting system after SWL without subsequent nephroscopy is unlikely.
- While non-contrasted computed tomography is now considered the gold-standard method for determining stone-free status, fragments adjacent to nephrostomy tubes may not be detected with this imaging modality.

SWL Monotherapy

- SWL monotherapy is not appropriate for most patients but may be considered in those with stone burdens of <500 square millimeters and no or minimal dilatation of the renal collecting system.
- If SWL is undertaken, establish adequate drainage of the treated renal unit with either an internalized ureteral stent or percutaneous nephrostomy tube before treatment.
- SWL monotherapy can result in significant postoperative complications, including steinstrasse, renal colic, sepsis and perinephric hematoma.

Open Surgery

- Open surgery (nephrolithotomy by any method) is not appropriate for most patients.
- Stone-free states are similar for PNL-based therapy and open surgery, but PNL-based therapy may result in reduced convalescence, shorter hospitalizations and reduced narcotic requirements.
- Consider open surgery in patients with extremely large stag-

horn calculi, especially in those with unfavorable collecting-system anatomy and in patients with abnormalities of the body habitus, such as extreme morbid obesity or skeletal abnormalities, that may preclude fluoroscopy and endoscopic therapies.

- Anatomic nephrolithotomy is usually the preferred operation in such cases.

Management of Non-index Patients

Poorly Functioning Kidney

- Consider nephrectomy when the involved kidney has negligible function and the contralateral kidney is normal.

Staghorn or Partial Staghorn Cystine Stones

- SWL monotherapy is not appropriate for patients with staghorn or partial staghorn cystine stones.

Children

- Staghorn stones are rare in children.
- Consider either SWL monotherapy or percutaneous-based therapy.
- The following issues need to be considered before using SWL in children:
 - ◆ Animal studies have shown that the developing kidney may be more susceptible to the bioeffects of SWL.
 - ◆ SWL has not been approved by the U.S. Food and Drug Administration (FDA) for this specific indication, a fac-

tor that should be considered in the risk-versus-benefit assessment.

Surveillance and Medical Management

- The management of patients with staghorn calculi continues after stone removal as these patients are at risk for stone recurrence.
- Measures to attenuate future stone activity should be undertaken, and stone analysis is the initial step.
- If the stone is composed of any non-struvite/calcium carbonate apatite components, 24-hour urine testing is indicated.
- Medical therapy may be appropriate for patients with metabolic abnormalities to limit stone recurrence.
- Patients harboring struvite/carbonate apatite stones may still be at risk for recurrent urinary tract infection after stone removal. Consider prophylactic or suppressive antibiotic therapy for these patients.
- Patients with abnormal lower urinary tracts (for example, neurogenic bladder or urinary diversion) undergoing removal of infection-related calculi are at highest risk for stone recurrence. Consider a more aggressive approach, such as the utilization of the urease inhibitor acetohydroxamic acid for these patients.

SURGICAL MANAGEMENT OF FEMALE STRESS URINARY INCONTINENCE

Guideline (2009)

Evaluation of Women with SUI or SUI with Prolapse

Evaluation and symptom assessment

The evaluation of the index patient should include:

Additional diagnostics:

Indications for further testing include:

Differential diagnoses

Comorbidities affecting treatment outcomes

Initial Management and Discussion of Treatment Options with the Patient

Treatment options

Possible surgical complications:

Postoperative complications:

There are two principle causes of incontinence – stress urinary incontinence (SUI) and detrusor overactivity. Patient history, physical examination and urodynamic studies are helpful in determining which of these is causative for incontinence.

Estimates of the prevalence of SUI vary widely due to inconsistencies in the definitions and differences in population studied. A large meta-analysis reported an estimated prevalence for urinary incontinence of 30% in women aged 30 to 60 years, with approximately half of the cases attributed to SUI; another study reported the prevalence of SUI was 5% to 30% in European women. SUI has a significant impact on quality of life; In 2009, the AUA updated its 1997 clinical guidance on the Surgical Management of Stress Urinary Incontinence.

Evaluation of Women with SUI or SUI with Prolapse

Purpose is manifold:

- To document and characterize SUI,
- to assess differential diagnosis and comorbidities,
- to prognosticate and aid in the selection of treatment, and
- to assess initial symptom bother and expectations for outcomes of therapy.

Evaluation and symptom assessment

Evaluation is important to assess:

- demonstration of incontinence with increasing abdominal pressure,
- frequency of urination,
- severity of symptoms and degree of bother,
- urethral sphincter function and
- the degree of urethral mobility.

The evaluation of the index patient should include:

- Focused history
 - ◆ Characterization of incontinence (stress, urge, etc.)
 - ◆ Frequency, bother and severity of incontinence episodes
 - ◆ Impact of symptoms on lifestyle
 - ◆ Patient's expectations of treatment
- Focused physical examination
- Objective demonstration of SUI

- Assessment of postvoid residual urine volume
- Urodynamic evaluation may be of assistance in elucidating complex presentations of incontinence.

Additional diagnostics:

- Urinalysis and culture, if indicated
- Pad testing and/or voiding diary
- Urodynamics
- Cystoscopy
- Imaging

Indications for further testing include:

- An inability to make a definitive diagnosis based on symptoms and the initial evaluation
- Concomitant overactive bladder symptoms
- Prior lower urinary tract surgery, including failed anti-incontinence procedures
- Known or suspected neurogenic bladder
- Negative stress test
- Abnormal urinalysis such as unexplained hematuria or pyuria
- Excessive residual urine volume
- Grade III or greater pelvic organ prolapse
- Any evidence for dysfunctional voiding

Differential diagnoses

The differential diagnosis of stress incontinence includes:

- Detrusor overactivity
- Low bladder compliance
- Overflow incontinence
- stress-induced detrusor overactivity
- Urethral diverticulum
- Urinary fistula
- Ectopic ureter

Overflow incontinence is a clinical diagnosis, whereas detrusor overactivity, low bladder compliance, and stress-induced detrusor overactivity are essentially urodynamic diagnoses. Urethral diverticulum and urinary fistula can be sometimes be confirmed on the basis of history and exam, but may, in some instances, require urinary tract imaging or other procedures for confirmation. Various imaging techniques for urethral diverticula may be used. Urinary fistula and ectopic ureter may be diagnosed by examination, cystoscopy and upper and lower urinary tract imaging.

Comorbidities affecting treatment outcomes

An understanding of the specific comorbidities allows for individualized treatment planning, informed consent, and the surgeon's estimate of a successful outcome, including the potential occurrence of complications. Comorbidities include:

- Urinary urgency
- Urge incontinence

- Anatomic features such as pelvic organ prolapse
- Urethral mobility and other urethral abnormalities, such as intrinsic stricture disease
- The number and location of ureteral orifices (e.g. ectopic)
- Detrusor overactivity
- Urethral obstruction
- Low bladder compliance
- Impaired or absent detrusor contractility

Initial Management and Discussion of Treatment Options with the Patient

Prior to treatment, the patient should be counseled regarding surgical and nonsurgical options, including both benefits and risks.

- Choice of procedure should be made as a collaborative effort between the surgeon and patient, and should consider both patient preferences and the surgeon's experience and judgment.
- Discussion of urinary tract erosion should be part of the informed consent process, particularly when selecting synthetic slings.
- Discussion of treatment outcomes should be included.
 - ◆ Patients with SUI may experience no other lower urinary tract symptoms or may develop one or more symptoms postoperatively.
 - ◆ Alternatively, patients with one or more preoperative

lower urinary tract symptoms may have symptoms that independently improve, persist, or worsen.

- ◆ In addition, the de novo development, improvement or worsening of SUI symptoms may be acute (temporary) or chronic (permanent). These symptoms may also increase (aging of population, comorbidities) or decrease (resolution of perioperative alterations) over time.
- ◆ Overactive bladder (urge incontinence) is common in women with SUI. Surgical treatment for SUI may not alleviate OAB symptoms and, in some cases, may complicate treatment.

Treatment options

Patients with urge incontinence without stress incontinence should not be offered a surgical procedure for stress incontinence. However, patients with mixed incontinence with a significant stress incontinence component may undergo surgical correction for stress incontinence.

Surgical procedures for SUI and prolapse may be safely performed concomitantly in appropriately selected women. Tensioning of any sling should not be performed until prolapse surgery is completed.

Although not equivalent, there are five major types of procedures that may be considered for the index patient:

- Injectable bulking agents
- Laparoscopic suspensions

- Retropubic suspensions
- Artificial urinary sphincter (indicated in patients not amenable to treatment with other procedures)
- Slings (midurethral and pubovaginal)
 - ◆ Intraoperative cystourethroscopy should be performed in all patients undergoing sling surgery to avoid complications. Synthetic sling surgery is contraindicated in stress incontinent patients with:
 - a concurrent urethrovaginal fistula,
 - urethral erosion,
 - intraoperative urethral injury, and
 - urethral diverticulum.
 - ◆ The Panel believes that using synthetic material in these circumstances may place the patient at higher risk for subsequent urethral erosion, vaginal extrusion, urethrovaginal fistula and foreign body granuloma formation.

Possible surgical complications:

- Perforation of bowel and/or blood vessels, posing a life-threatening risk
- Bladder injury (more frequent with concomitant prolapse repair)
- Urethral injury retention

Postoperative complications:

- Urinary tract infections
- Urinary tract erosion

- Vaginal extrusion
- Sexual dysfunction infection with or without local extension
- Abscess
- Osteomyelitis
- Febrile morbidity
- Dermatologic complications
- Bowel injury
- Iliac, femoral, obturator, or epigastric vessel injury
- Death—in fewer than 2 percent of all cases

MANAGEMENT OF URETERAL CALCULI

Guideline (2007)

Patient Management Special Considerations

A joint effort of the European Association of Urology (EAU) and the American Urological Association (AUA), this guideline focuses on the changes introduced in ureteral stone management in the last decade. Recommendations made by the Panel are based on the typical individual with a ureteral calculus. This index patient is a nonpregnant adult with a unilateral noncystine/nonuric acid radiopaque ureteral stone, without renal calculi requiring therapy, whose contralateral kidney functions normally and whose medical condition, body habitus and anatomy allow any one of the presented treatment options to be undertaken. The Panel also provided guidance for the management of pediatric patients with ureteral calculi. Patient management was established in terms of stone size and stone location.

Patient Management

For all patients

- Treat patients with bacteriuria with appropriate antibiotics before the intervention. Either urine culture or screening with dipsticks in uncomplicated cases is recommended.
- Do not perform stone extraction with a basket unless it is performed under direct endoscopic visualization.

For ureteral stones <10 mm in size

- Consider observation with periodic evaluation in patients with newly diagnosed stones whose symptoms are controlled. These patients may be offered appropriate medical therapy to facilitate stone passage during the observation period. Alpha blockers appear to be superior to calcium channel blockers in facilitating stone passage and may be the preferred agent for medical expulsive therapy especially in distal ureteral stones.
- Counsel the patient on the attendant risks of medical therapy, including associated drug side effects, and inform them that the drug is administered for an “off label” use.
- Confirm that patients who elect for spontaneous passage or medical therapy have well-controlled pain, no clinical evidence of sepsis and adequate renal functional reserve.
- Perform periodic imaging studies to monitor stone position and to assess for hydronephrosis.
- Proceed with removal in the presence of persistent obstruction, failure of stone progression or in the presence of increasing or unremitting colic.

For ureteral stones >10 mm in size

Most patients will require surgical treatment. No recommendations can be made for spontaneous passage with or without medical expulsive therapy for stones of this size.

- In patients with ureteral stones >10 mm who typically require stone removal:

- ◆ Inform the patient about the existing active treatment modalities, including the associated relative benefits and risks. Discuss stone-free rates, anesthesia requirements, need for additional procedures and associated complications with ureteroscopy (URS) and shock wave lithotripsy (SWL).
- ◆ Both SWL and URS are acceptable first-line treatments. URS yields significantly greater stone-free rates but has higher complication rates.
- ◆ Routine stenting is not recommended as part of SWL.
- ◆ Stenting following uncomplicated URS is optional. Although stenting is associated with complications and with bothersome lower urinary tract symptoms and pain that can affect quality of life, clear indications for stenting include:
 - ureteral injury,
 - ureteral edema,
 - solitary kidney,
 - renal insufficiency or
 - a large residual stone burden.
- ◆ Percutaneous antegrade ureteroscopy is an acceptable first-line treatment in:
 - select cases with large impacted stones in the upper ureter;
 - in combination with renal stone removal;
 - for ureteral stones after urinary diversion; and
 - in select cases resulting from failure of retrograde ureteral access to large, impacted, upper ureteral stones.
- ◆ Consider laparoscopic or open surgical stone removal in rare cases where SWL, URS and percutaneous URS fail or are unlikely to be successful. In very difficult situations,

however, such as with very large, impacted stones and/or multiple ureteral stones, or in cases of concurrent conditions requiring surgery, an alternative procedure may be desired as primary or salvage therapy. Laparoscopic ureterolithotomy is a less invasive alternative to open surgery in this setting.

For pediatric patients

- ◆ Both SWL and URS are effective.
- ◆ Treatment choices should be based on the child's size and urinary tract anatomy. The small size of the pediatric ureter and urethra favors the less invasive approach of SWL.

For the nonindex patient

- Urgently decompress the collecting system with either percutaneous drainage or ureteral stenting in septic patients with obstructing stones. Definitive treatment of the stone should be delayed until sepsis is resolved.

Special Considerations

- Pregnant patients have traditionally been managed with temporizing therapies (ureteral stenting, percutaneous nephrostomy) that are usually poorly tolerated. Successful outcomes with URS have been reported.
- Cystine stones are typically resistant to SWL but can be fragmented with intracorporeal lithotripsy during URS. Patients with cystinuria are prone to recurrent stones, subject to repetitive removal procedures, and consequently at

risk of developing renal insufficiency. Prophylactic medical therapy and close follow-up can limit recurrence.

- Uric acid stones are typically radiolucent but can be treated with SWL if the stone can be localized with either ultrasound or contrast and fluoroscopy. Alkalinization of urinary pH may be utilized with concomitant medical expulsive therapy. In patients who are not candidates for observation, URS is effective.

MANAGEMENT AND SCREENING OF PRIMARY VESICoureTERAL REFLUX IN CHILDREN

Guideline (2010)

- Initial Evaluation of the Child with VUR
- Initial Management of the Child with VUR
- Follow-up Management of the Child with VUR
- Interventions for the Child with BT-UTI
- Surgical treatment of VUR
- Management Following Resolution of VUR
- Screening for VUR in Siblings
- Neonates with Prenatal Hydronephrosis

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.

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).

TABLE 1.**Management of the child with VUR and UTI >1 year of age**

Patient Presentation	Management	
	CAP	Observation
No BBD, recurrent febrile UTI, renal cortical abnormalities	Option	Option
BBD, recurrent febrile UTI, or renal cortical abnormalities	Recommended	Not recommended

