FRASER HEALTH LONG TERM CARE ROUNDS

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COMMON UROLOGICAL CONDITIONS IN LTC

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DISCLOSURES

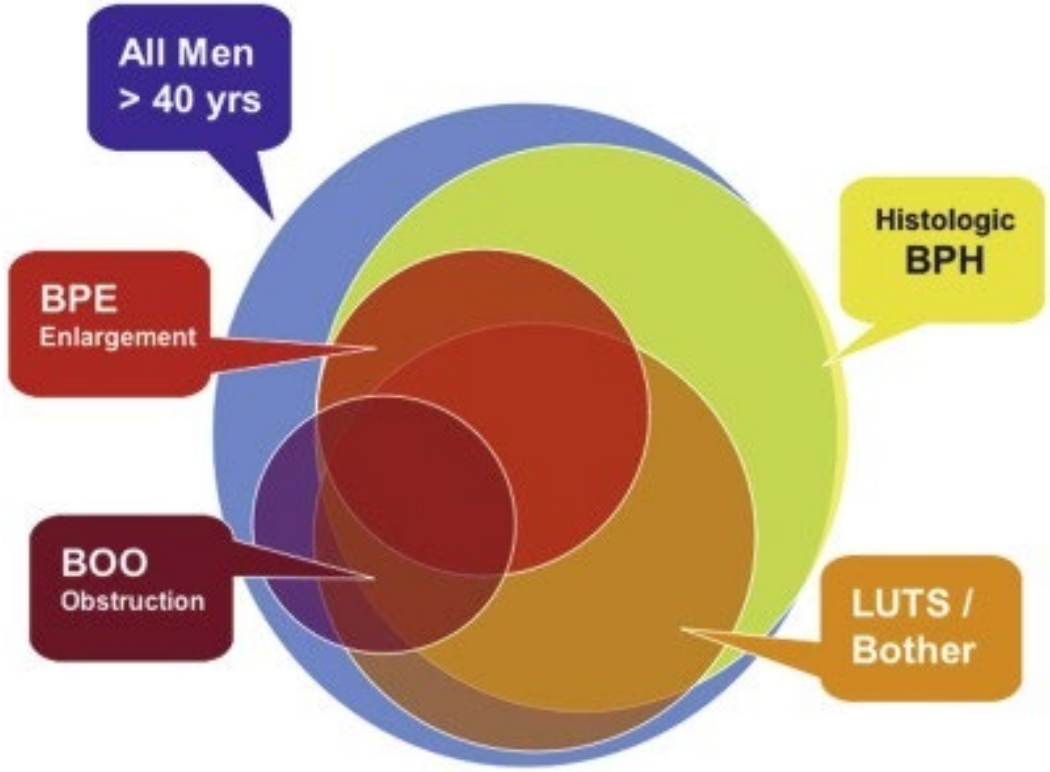
- I **DO** have an affiliation (financial or otherwise) with any for-profit or not-for-profit organizations
- *If affiliation with above, please list:*
- Speaking Honoraria for Pfizer and Tersera

LEARNING OBJECTIVES

- To identify and manage common urological conditions in LTC
  - Male Lower Urinary Tract Symptoms (BPH)
  - Urinary retention
  - Hematuria
  - Urinary tract infections

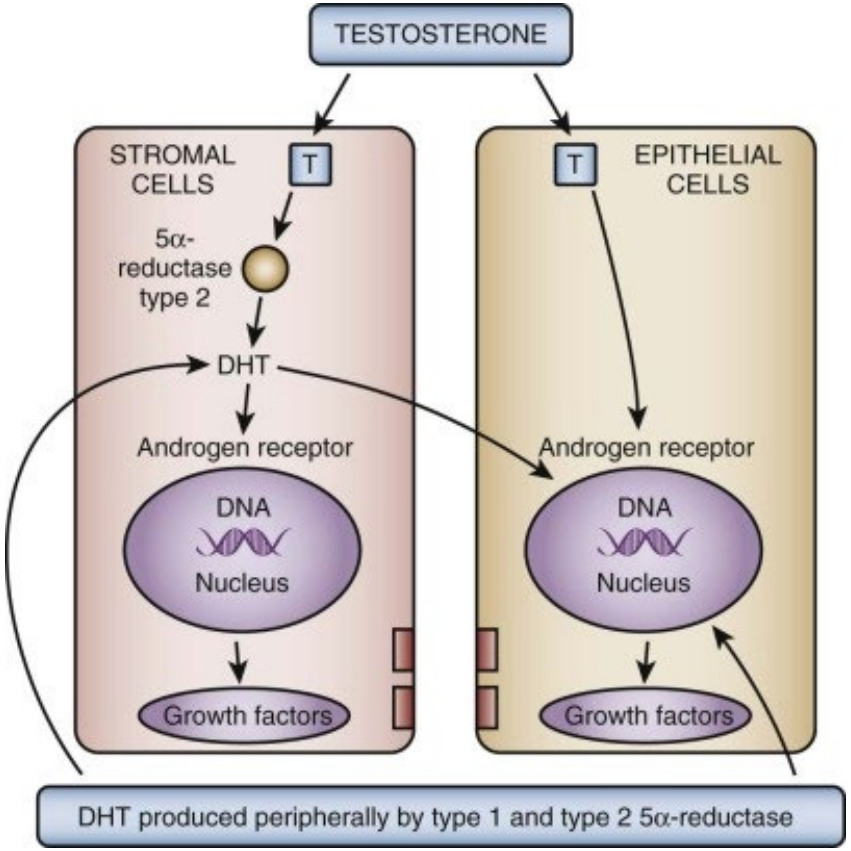
Male LUTS

- Previously called “prostatism”
- Previously thought to be urethral obstruction from mass effect
- Significant portion may be due to detrusor (bladder muscle) dysfunction, polyuria, sleep disorders, and other systemic disorders

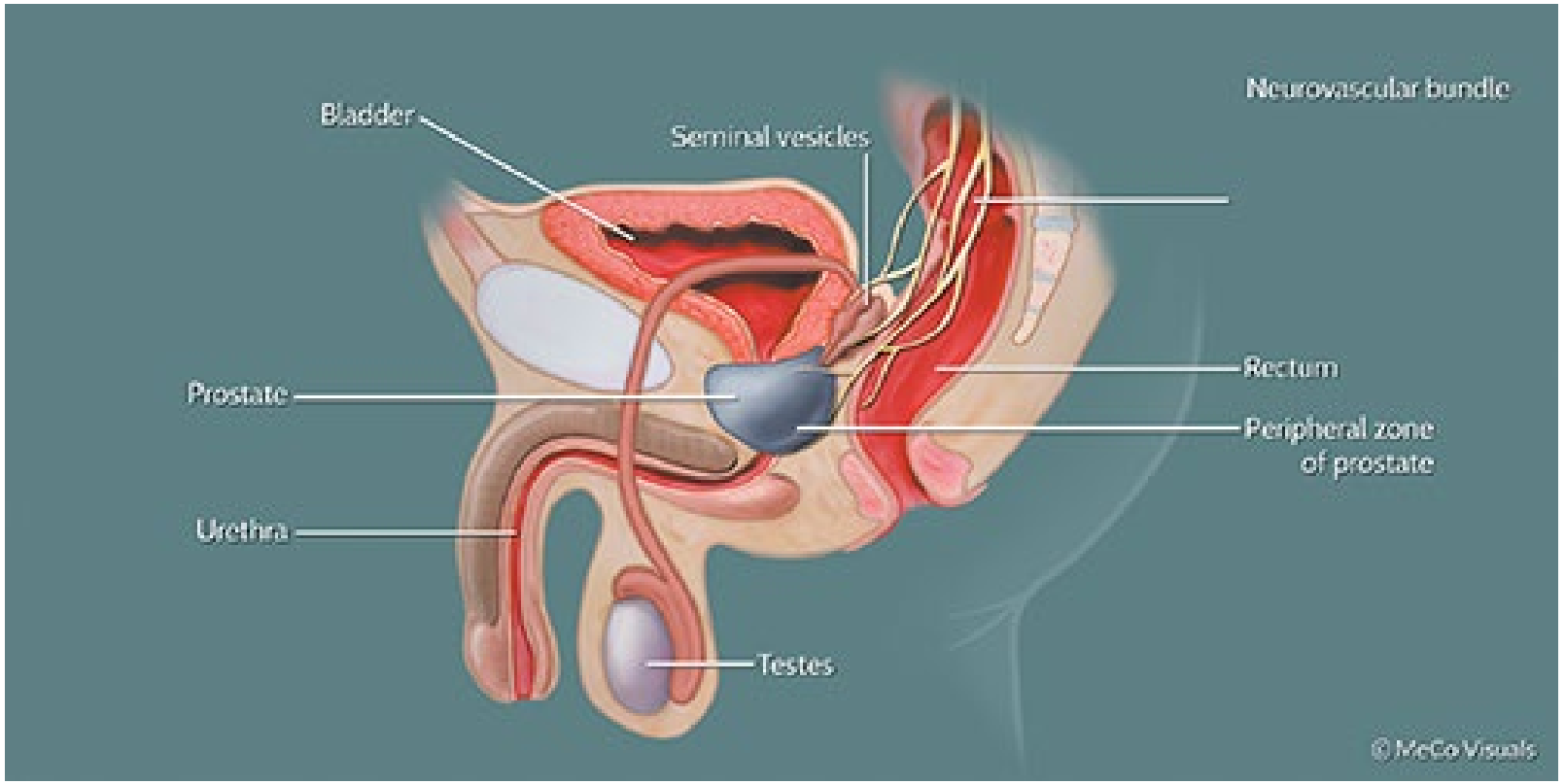


Male LUTS

- BPH (Benign Prostatic Hyperplasia) is a histopathological diagnosis – increased number of epithelial and stromal cells in the periurethral area of the prostate
  - Androgens required for cell proliferation and differentiation in prostate
  - Prostate epithelium has 5-alpha-reductase which converts T into DHT
    - 2 types – Type 1 predominant in extraprostatic sites such as skin and liver, Type 2 is predominant in the prostate

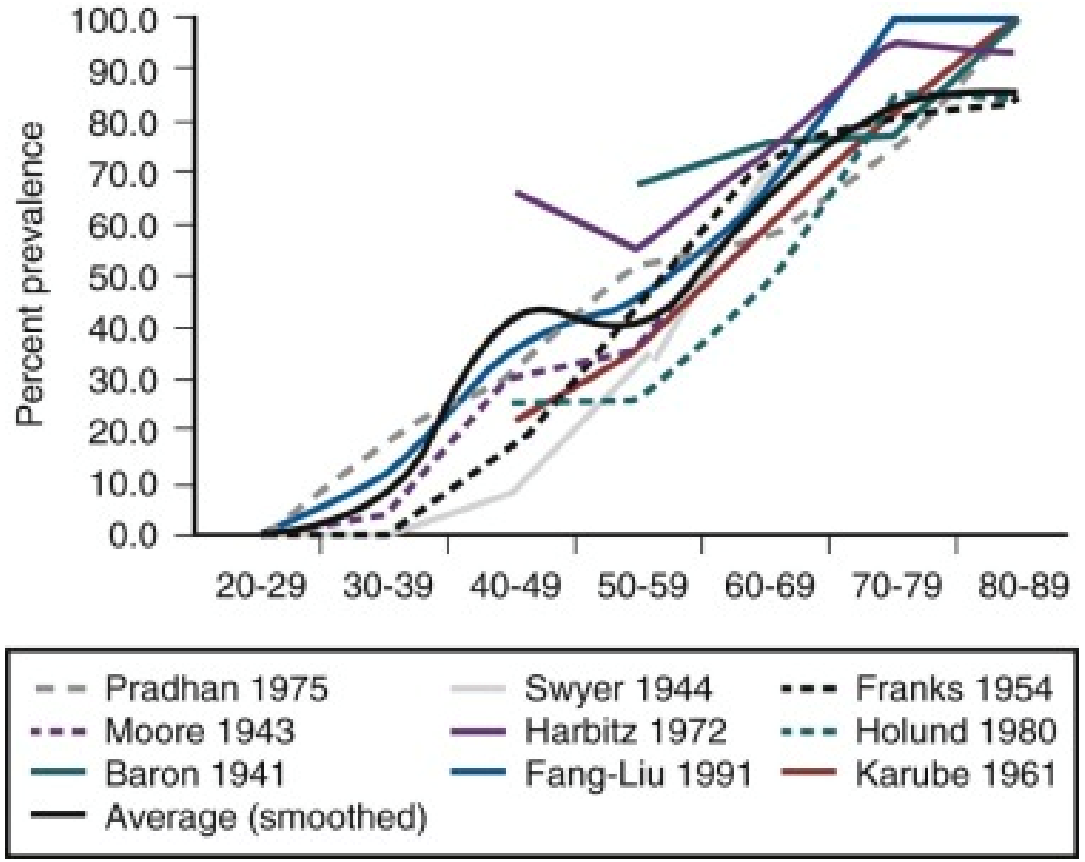


Male LUTS


Bladder
Seminal vesicles
Neurovascular bundle
Rectum
Prostate
Peripheral zone of prostate
Urethra
Testes
© MeCo Visuals

Male LUTS

- Prevalence:



Berry SJ, Coffey DS, Walsh PC, et al. The development of human benign prostatic hyperplasia with age. J Urol 1984;132:474–9.

Male LUTS - Evaluation

CUA GUIDELINE

2010 Update: Guidelines for the management of benign prostatic hyperplasia

J. Curtis Nickel, MD, FRCSC;[*] Carlos E. Méndez-Probst, MDH;[†] Thomas F. Whelan, MD, FRCSC;[‡] Ryan F. Paterson, MD, FRCSC;[§] Hassan Razvi, MD, FRCSCH;[†] and the Canadian Prostate Health Council and the CUA Guidelines Committee

Male LUTS – Mandatory Evaluation

- History
  - HPI
  - PM/SHx
  - Meds
  - Allergies
  - Social Hx
  - Fam Hx
- Physical
  - DRE
- Labs
  - Urinalysis

Male LUTS– Recommended Evaluation

- International Prostate Symptom Score
- PSA if ≥50 and >10-year life expectancy

International Prostate Symptom Score (I-PSS)

Patient Name: _____ **Date of birth:** _____ **Date completed** _____

In the past month:	Not at All	Less than 1 in 5 Times	Less than Half the Time	About Half the Time	More than Half the Time	Almost Always	Your score
1. Incomplete Emptying How often have you had the sensation of not emptying your bladder?	0	1	2	3	4	5	
2. Frequency How often have you had to urinate less than every two hours?	0	1	2	3	4	5	
3. Intermittency How often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
4. Urgency How often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5. Weak Stream How often have you had a weak urinary stream?	0	1	2	3	4	5	
6. Straining How often have you had to strain to start urination?	0	1	2	3	4	5	
	None	**1 Time**	**2 Times**	**3 Times**	**4 Times**	**5 Times**	
7. Nocturia How many times did you typically get up at night to urinate?	0	1	2	3	4	5	
Total I-PSS Score							

Score: 1-7: *Mild* 8-19: *Moderate* 20-35: *Severe*

Quality of Life Due to Urinary Symptoms	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	**0**	**1**	**2**	**3**	**4**	**5**	**6**

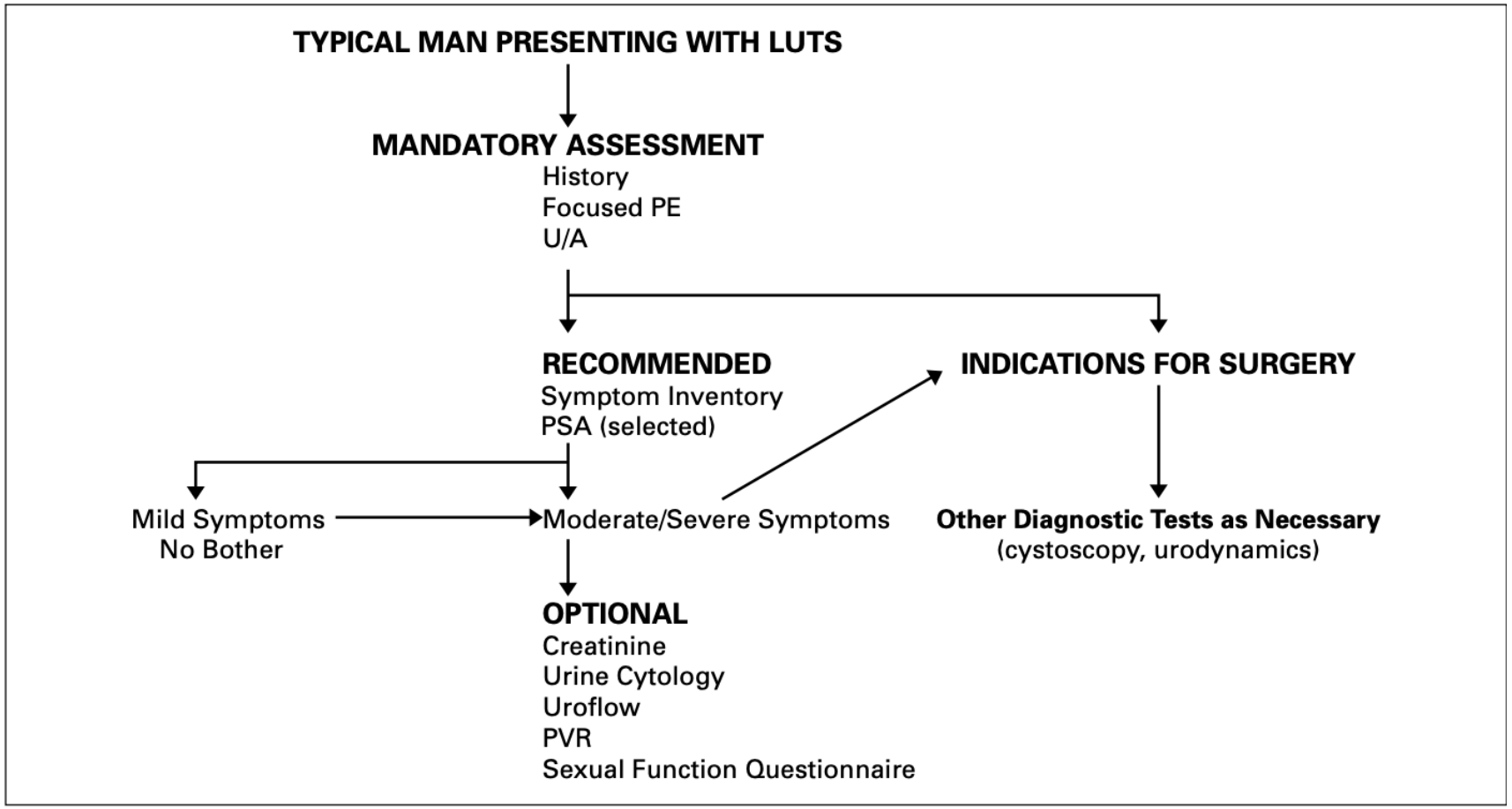
Male LUTS – Optional Evaluation

- Serum Creatinine
- Urine cytology (with significant irritative sx)
- Uroflow
- Voiding diary
- PVR
- Sexual fxn questionnaire

Male LUTS – Not Recommended

- Cystoscopy
- Cytology (all comers)
- Urodynamics
- Radiological evaluation of the upper tract
- Prostate US
- Prostate biopsy

Male LUTS Evaluation



Male LUTS - Treatment

- Mild Symptoms (IPSS 1-7)
  - Lifestyle modifications, Meds
- Moderate Symptoms (IPSS 8-18)
  - Lifestyle modifications, Meds, Surgery
- Severe Symptoms (IPSS 19-35)
  - Lifestyle modifications, Meds, Surgery
- For Moderate – Severe Symptoms depends on **BOTHER** as well

Male LUTS - Treatment

- Principles: Decision making should be guided by severity of symptoms, degree of bother, and patient preference
- Lifestyle Modification
  - Fluid restriction – esp prior to bedtime
  - Avoidance of caffeinated beverages and spicy foods
  - Avoidance/monitoring of certain meds (diuretics, decongestants, antihistamines, antidepressants)
  - Timed voiding, double voiding
  - Pelvic floor exercises
  - Tx of constipation

Male LUTS - Treatment

- Pharmacotherapy
  - Phytotherapies
    - Saw palmetto most rigorously studied
    - Double blind RCT failed to show any significant benefit over placebo!
  - Alpha-blockers
    - Alfuzosin, Doxazosin, Terazosin, Tamsulosin, Silodosin all are appropriate
    - Do not alter natural progression of disease!
    - s/e: lightheadedness, fatigue, rhinorrhea, retrograde ejaculation
  - 5-alpha reductase inhibitors (5-ARIs)
    - Finasteride (Type 2 only) and Dutasteride (Type 1 and 2)
    - Decrease prostate volume by 25%, decreased risk of retention
    - s/e: Ejaculatory dysfunction, ED, rare gynecomastia

Bent S, Kane C, Shinohara K, et al. Saw palmetto for benign prostatic hyperplasia. N Engl J Med 2006;354:557-66

Male LUTS - Treatment

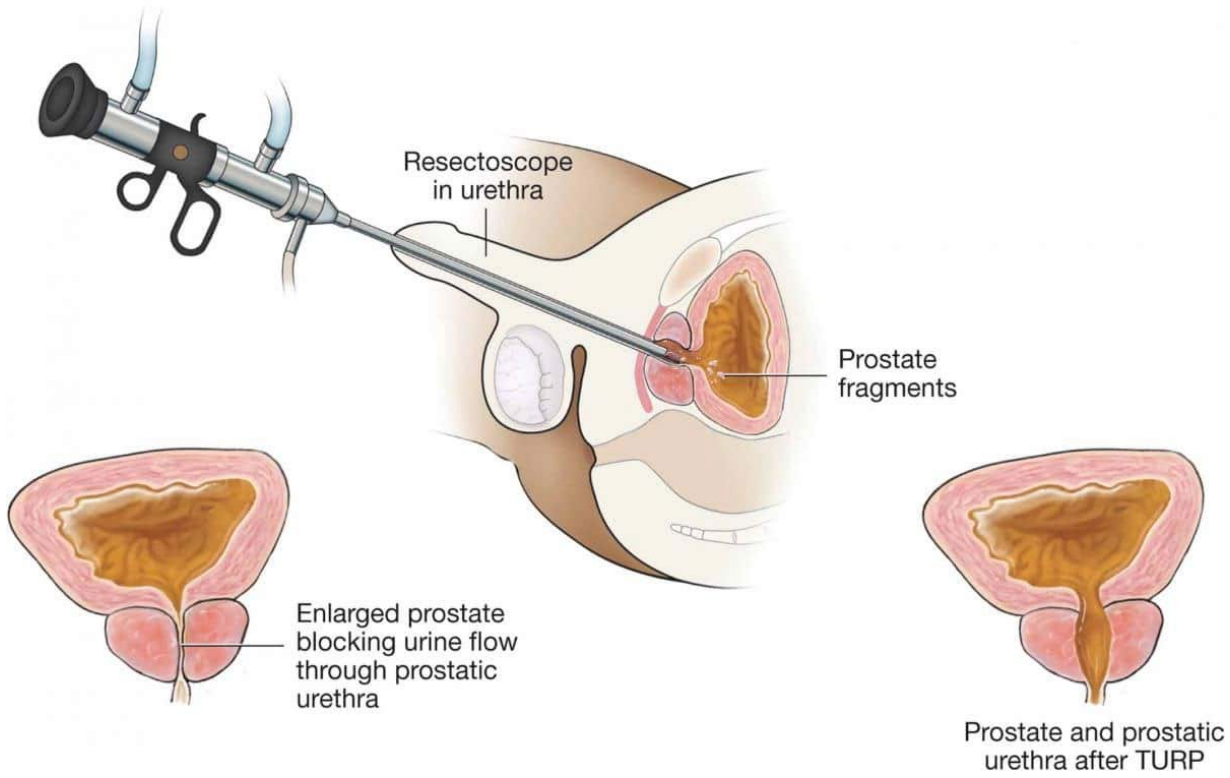
- Pharmacotherapy – Continued
  - Combination therapy:
    - Alpha blocker + 5-ARI
      - Reduction in progression of BPH
      - Reduces risk of AUR
      - Reduces need for BPH surgery
    - Best for:
      - PSA >1.4
      - Volume ≥30g
      - Age >50
      - Mod-Severe IPSS
    - Can consider stopping alpha-blocker after 6-9 months

Male LUTS - Treatment

- Pharmacotherapy – Continued
  - Phophodiesterase inhibitors
    - PDE 4 and 5 are present in prostate and regulate smooth muscle tone
    - Tadalafil 5 mg po daily shown to improve QoL, IPSS, and ED
    - Not currently recommended by CUA
    - High cost
  - OAB medications
    - Combination therapy with alpha-blocker can be helpful
    - Use with caution in patients with elevated PVR (>200) or hx spontaneous retention

Male LUTS - Treatment

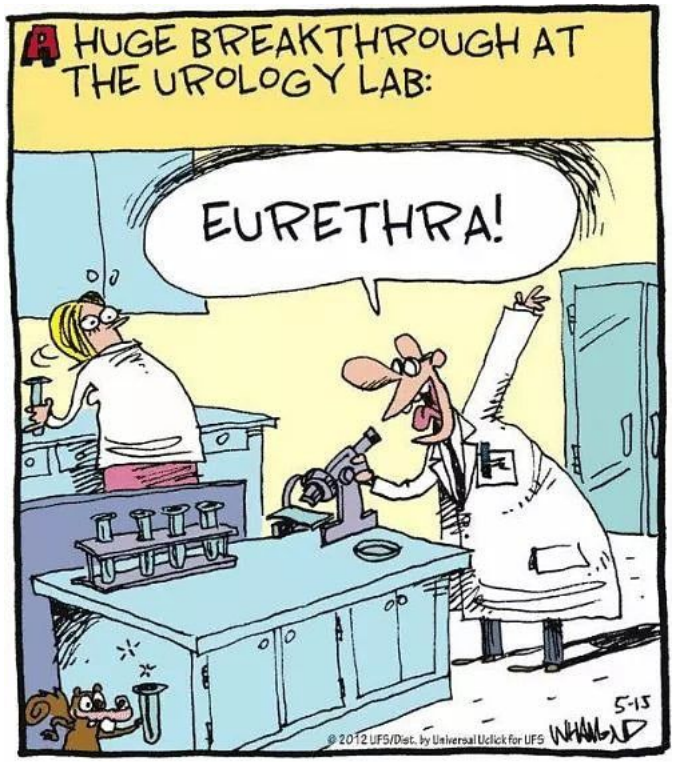
- Surgery
  - Standard of care:
    - TURP
  - Optional:
    - Bipolar TURP
    - Laser prostatectomy
      - HoLEP
      - Greenlight PVP
    - TUIP
      - Small <30g prostates who want to preserve antegrade ejaculation
    - Open Prostatectomy
      - Prostates to large to safely manage endoscopically



Male LUTS - Treatment

- Minimally invasive surgical therapies
  - Transurethral microwave therapy (TUMT)
  - Transurethral needle ablation
  - Urethral stents
  - Urolift
  - Aquablation
  - Prostatic artery embolization
- Limited evidence to support these
- Uninsured procedures - $$$$

Questions?



Urine line for the Nobel Prize.

URINARY RETENTION

- CAN BE SECONDARY TO BLADDER OUTLET OBSTRUCTION, DETRUSOR UNDERACTIVITY, OR A COMBINATION!

Overview of normal LUT function

- **2 discrete processes:**

1. Bladder filling and urine storage

2. Bladder emptying or voiding

Overview of normal LUT function

- **Bladder filling and storage:**
  - Accommodation of increasing urine volume
  - Low Pressure (normal compliance - Change in volume/Change in pressure)
  - Closed bladder outlet at rest and with increases in increased abdominal pressure
  - Absence of involuntary bladder contractions

Overview of normal LUT function

- **Bladder filling and storage:**
  - Bladder filling at normal physiologic rate should result in minimal change in intravesical pressure due to the viscoelastic properties of the bladder
  - Bladder unfolds from collapsed state and stretches
  - Collagen and elastin are main components of bladder wall stroma
    - Collagen changes with chronic inflammation, BOO, neurologic insults**, decreasing compliance**
    - Muscle hypertrophy can also result from BOO, **decreasing compliance**

Overview of normal LUT function

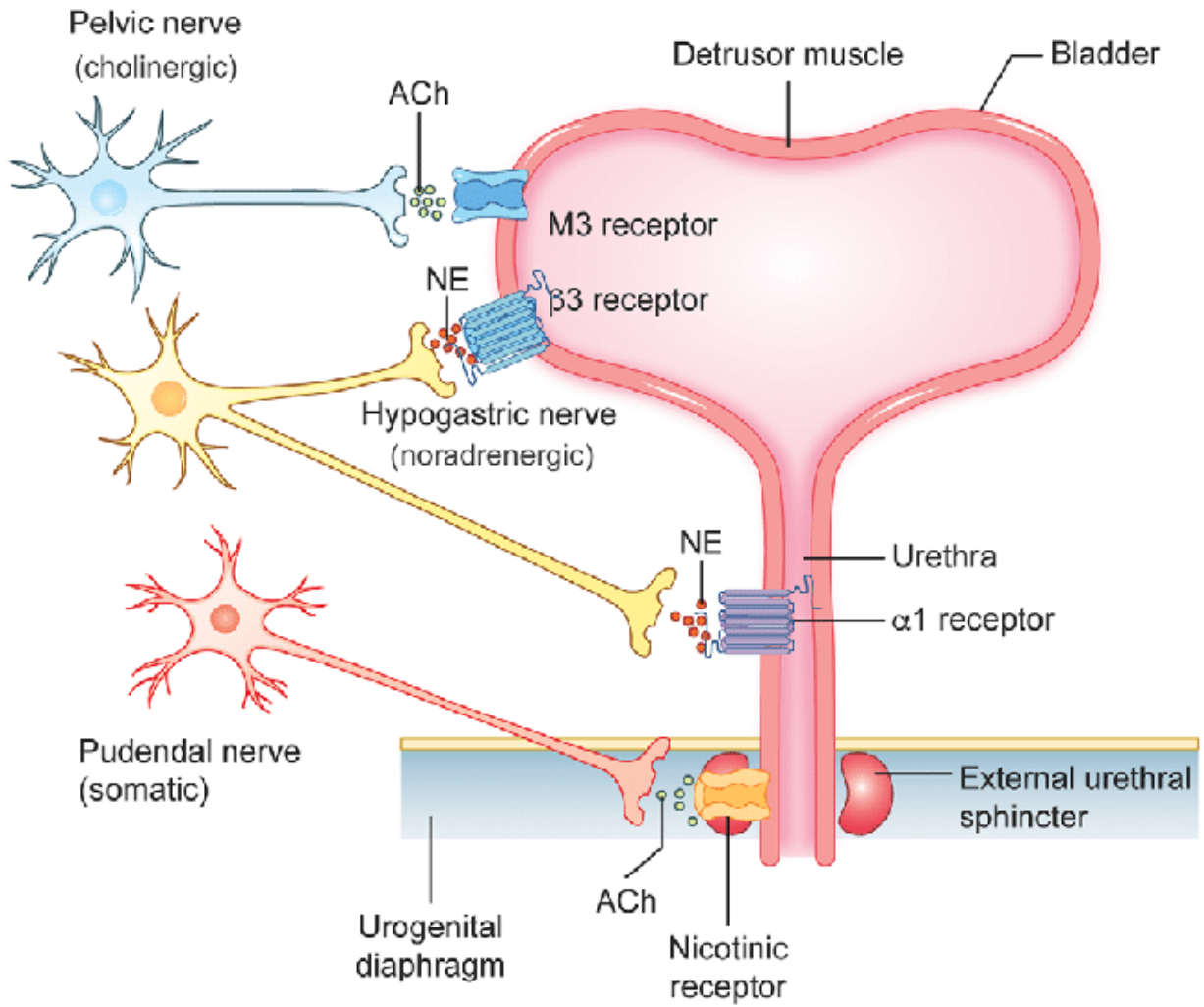
- **Bladder filling and storage:**
  - Spinal reflexes
    - Sympathetic inhibition of cholinergic transmission
    - **Stimulation of α1-adrenergic receptors** at the level of smooth sphincter
      - Increases resistance
    - **Stimulation of β3-adrenergic receptors** in the bladder smooth muscle
      - Decreases bladder wall tension
    - Guarding reflex – Increase in striated sphincter activity during normal bladder filling

Overview of normal LUT function

- **Bladder emptying/voiding:**
  - Coordinated contraction of bladder smooth muscles of adequate magnitude and duration
  - Lowering of resistance at both **smooth** and **striated muscle sphincters**
    - Smooth sphincter – bladder neck and urethra – involuntary control
    - Striated sphincter – external urethral sphincter under voluntary control
  - Absence of anatomic obstruction

Overview of normal LUT function

- **Bladder emptying/voiding:**
  - In general – increased bladder pressure from filling produces sensation of fullness, this is responsible for initiating normal voluntary emptying
  - First step in bladder emptying is relaxation of the voluntary external sphincter
    - Causes **inhibition of any spinal sympathetic reflexes** involved in filling
    - **Pelvic parasympathetic nerve activity (cholinergic)** thus responsible for coordinated contraction of bladder muscle
      - **Organized in the brainstem by the Pontine Micturation Center (PMC)**
    - **Inhibition of spinal sympathetic signals to smooth sphincter** decreases outlet resistance, potentially augmented by NANC mechanism **(Nitric oxide)**



Palma, J.-A. & Kaufmann, H. *Treatment of autonomic dysfunction in Parkinson disease and other synucleinopathies*. *Movement Disorders* **33,** (2018).

DETRUSOR UNDERACTIVITY (DUA)

- DUA is a common clinical problem associated with storage, voiding and postvoiding LUTS
- ICS defines as “a contraction of reduced strength and/or duration resulting in prolonged bladder emptying and/or failure to achieve complete bladder emptying within a normal time span”
  - May have weak stream, intermittency, hesitancy and straining
  - May have sensation of incomplete emptying
  - May have incontinence (especially during sleep)

DETRUSOR UNDERACTIVITY (DUA)

- More prevalent amongst institutionalized elderly
- Population prevalence not known due to lack of noninvasive marker (often diagnosed on urodynamics)
- Causes are incompletely understood, diverse range of factors implicated
  - Neurologic diseases, DM, BOO, Aging, Atherosclerosis
- Mechanisms can be classified into:
  - Myogenic - affecting detrusor muscles
  - Neurogenic - affecting neural control governing voiding reflex

DETRUSOR UNDERACTIVITY (DUA)

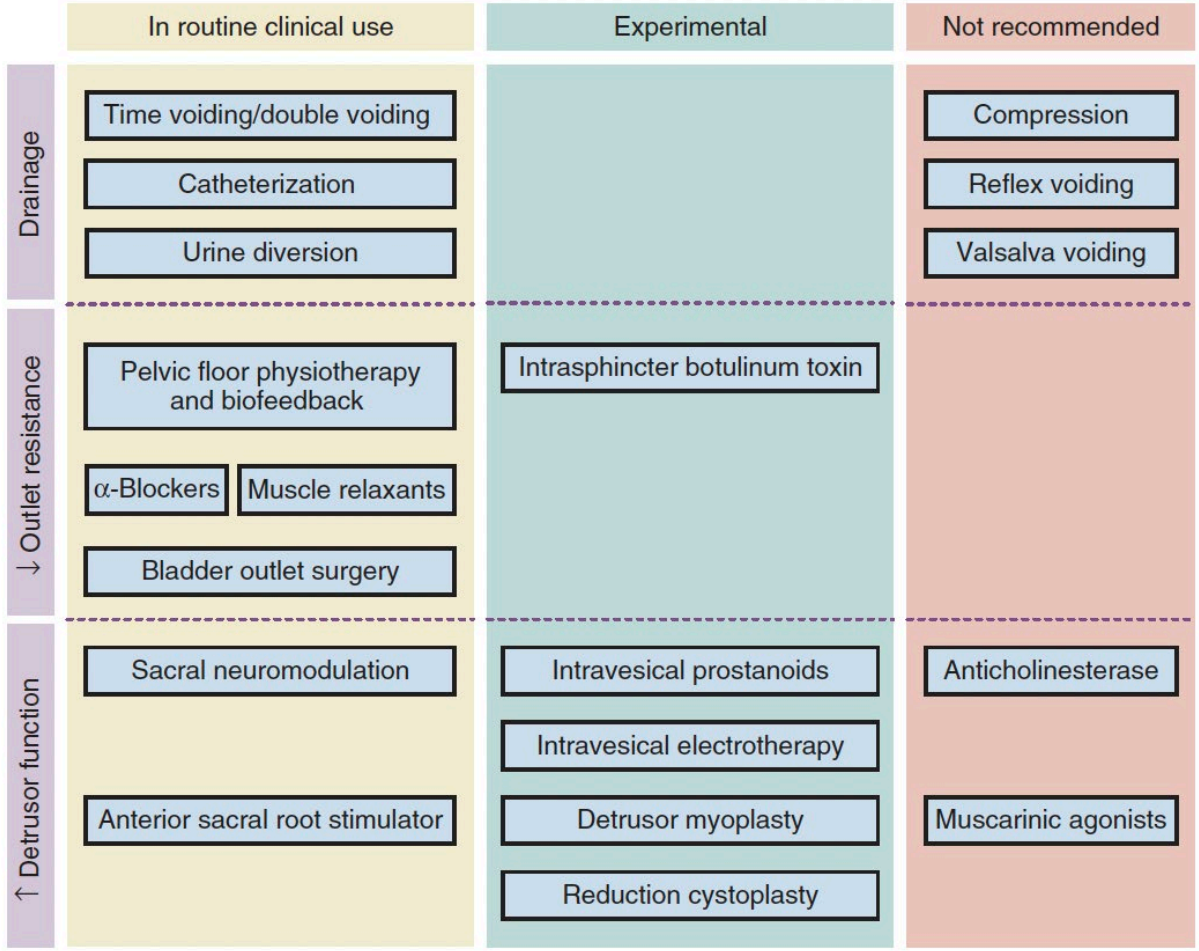


Fig. 118.7. Management options in detrusor underactivity.

DETRUSOR UNDERACTIVITY (DUA)

- Pharmacotherapies for DUA?
  - Parasympathomimetics
    - Significant side effects including diarrhea, bronchospasm, salivation, visual disturbances, rare severe cardiac depression
  - Alpha-blockers
    - Small studies have some improvements in voiding LUTS and maximal flow with Tamsulosin 0.2mg
    - Not standard of care, side effects of orthostatic hypotension

DETRUSOR UNDERACTIVITY (DUA)

- Bladder drainage options:
  - Behavioural changes - timed voiding, double voiding
  - CIC
  - Chronic foley catheter
    - Urethral
    - Suprapubic

DETRUSOR UNDERACTIVITY (DUA)

- Bladder drainage options:
  - No maximum PVR
    - Monitor for complications of incomplete emptying!
      - Recurrent UTI
      - Discomfort
      - Renal dysfunction - periodic renal fxn testing +/- US

Hematuria

- What is it?
  - Gross hematuria:
    - **Visible blood in the urine**
    - Always significant!
  - Microscopic hematuria:
    - **>2 RBC/HPF on two microscopic analysis**
    - Absence of recent menses, exercise, or instrumentation



Hematuria

- Why should we care?
  - Regarded as a symptom of malignancy until proven otherwise
- 1-16% prevalence in population
- Gross hematuria carries a 5x risk of urologic malignancy

Case 1

- 28yoM with 2 episodes of gross hematuria
  - Self limited
  - 6 month history of worsening slow urinary stream, hesitancy
  - Nonsmoker
  - No hx of trauma
  - Painless hematuria



Case 1

- Do we need to further investigate?

Case 1

- Gross hematuria (GHA) carries up to 25-30% chance of finding underlying pathology
- Needs evaluation **regardless of age**
- Key points on history to note:
  - Pain with hematuria can suggest infection or stone
  - Painless hematuria is more worrisome
  - Presence of clots can indicate more significant cause

Case 1

- How should we evaluate?
- Hx – want to assess for risk factors for urological malignancy
  - Such as?

Case 1

- How should we evaluate?
- Hx – want to assess for risk factors for urological malignancy
  - Smoking, Chemo, Rads, famHx, occupational exposures, recurrent UTIs, bladder stones, schistosomiasis, chronic catheterization etc.
- PEx
- Labs:
  - Which ones?

Case 1

- How should we evaluate?
- Hx – want to assess for risk factors for urological malignancy
  - Smoking, Chemo, Rads, famHx, occupational exposures, recurrent UTIs, bladder stones, schistosomiasis, chronic catheterization etc.
- PEx
- Labs:
  - Urine R+M, C+S, Urine cytology, lytes, Cr
- Upper tract investigations:
  - What imaging?

Case 1

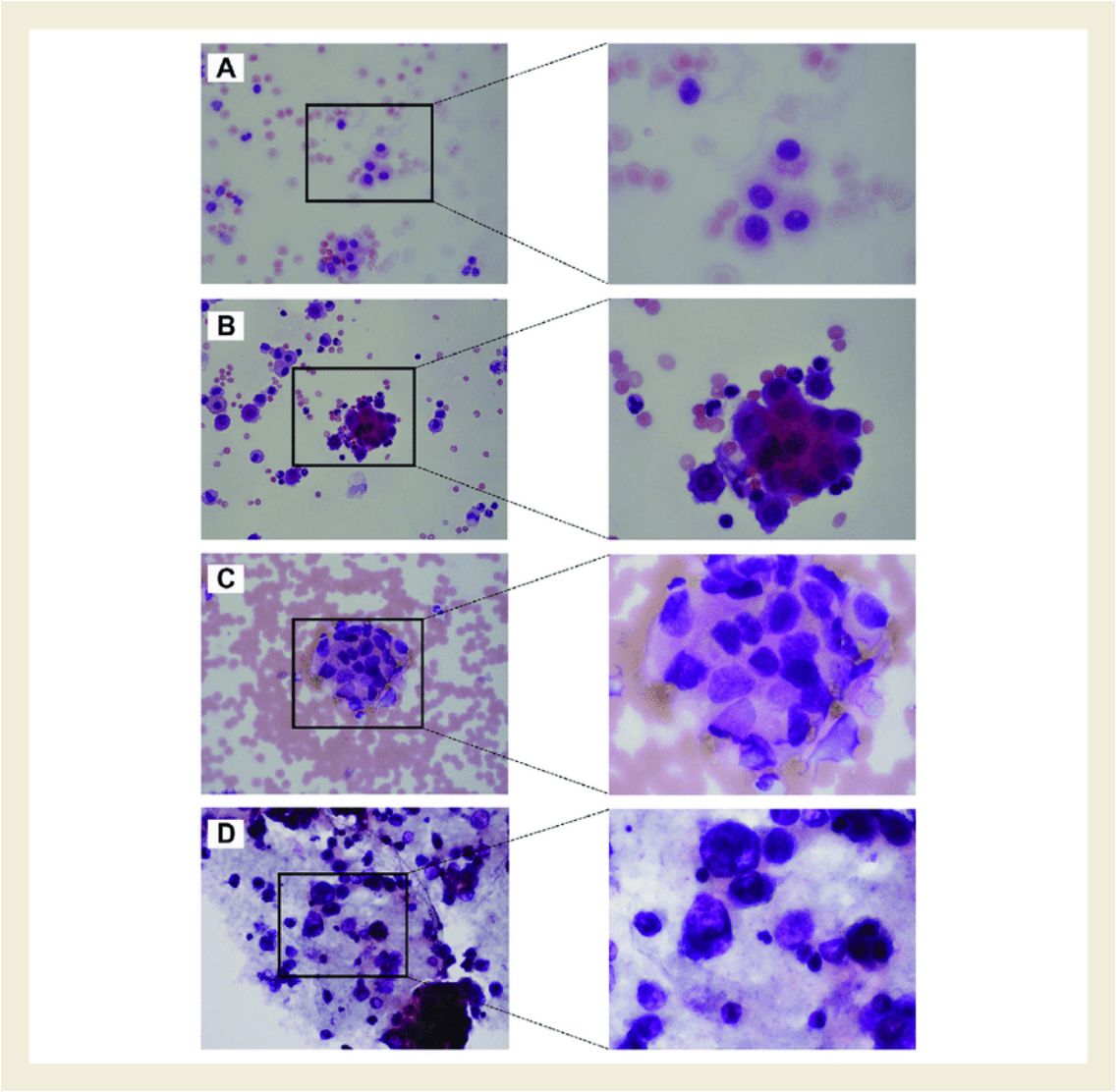
- How should we evaluate?
- Hx – want to assess for risk factors for urological malignancy
  - Smoking, Chemo, Rads, famHx, occupational exposures, recurrent UTIs, bladder stones, schistosomiasis, chronic catheterization etc.
- PEx
- Labs:
  - Urine R+M, C+S, Urine cytology, lytes, Cr
- Upper tract investigations:
  - CT Urogram
  - US or noncontrast MRI if renal insufficiency
- Lower tract investigations:
  - What now?

Case 1

- How should we evaluate?
- Hx – want to assess for risk factors for urological malignancy
  - Smoking, Chemo, Rads, famHx, occupational exposures, recurrent UTIs, bladder stones, schistosomiasis, chronic catheterization etc.
- PEx
- Labs:
  - Urine R+M, C+S, Urine cytology, lytes, Cr
- Upper tract investigations:
  - CT Urogram
  - US or noncontrast MRI if renal insufficiency
- Lower tract investigations:
  - Cystoscopy

Urine cytology

- Voided urine cytology is useful in the workup of hematuria
- Moderate sensitivity: ranges from 18-76%
- High specificity: can go as high as 90%
- Atypical changes can arise from inflammation, infection, stones, instrumentation, radiation etc.



Why cystoscopy?

- No imaging studies have replaced cystoscopy for ruling out lowr urinary tract pathology
- Cystoscopy is the **gold standard**

Potential causes for hematuria

- Upper tract:

Potential causes for hematuria

- Upper tract:
  - Renal cell carcinoma
  - Renal calculi
  - Pyelonephritis
  - Obstruction/hydronephrosis
  - Glomerulonephritis
  - Upper tract urothelial carcinoma
  - Renal vascular disorders ie. Renal vein thrombosis

Potential causes for hematuria

- Upper tract:
- Lower tract:

Potential causes for hematuria

- Upper tract:
- Lower tract:
  - Bladder cancer
  - BPH
  - Bladder stones
  - Cystitis
  - Urethral stricture
  - Trauma

Potential causes for hematuria

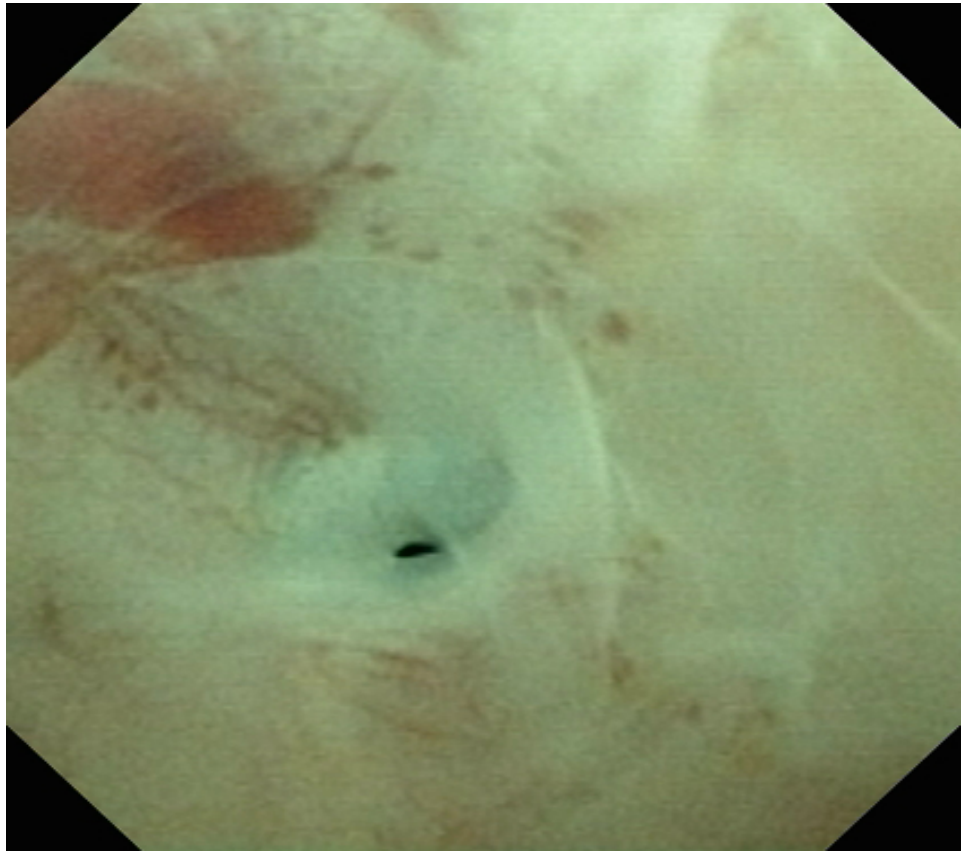
- Upper tract:
- Lower tract:
- False causes:

Potential causes for hematuria

- Upper tract:
- Lower tract:
- False causes:
  - Menstrual blood
  - Strenuous exercise (March hemoglobinuria)
  - Myoglobinuria
  - Food
    - Beeturia and Rhubarburia
  - Drugs
    - Phenazopyridine, methyldopa, senna, rifampin
  - Porphyria

Case 1

- UA, UCx
  - 1-5 WBC/HPF, 5-10 RBC/HPF
  - Cx neg
- Cytology
  - Negative for high grade atypia
- CT urogram
  - N upper tracts
- Cystoscopy
  - Narrow bulbar urethral stricture
  - Dilated sequentially



Case 1

- Hematuria and LUTS improved after dilation

Case 2

- 57yoF presenting for insurance urinalysis
  - Udip + Hb
  - UA 5-10 RBC/HPF
  - Cx neg
  - No GHA
  - Non-smoker
  - No LUTS and no pain

Case 2

- Do we need to further investigate this?

Case 2

- Do we need to further investigate this?
  - Yes!
  - Age >40 with microscopic hematuria (MHA)
    - Yield of ~11% of patient above age 40 will have significant findings
  - Do not need complete investigation for MHA in patients <40 and **no risk factors**
    - Can defer cystoscopy
    - Upper tract imaging in the for of renal US is reasonable for all patients

Case 2

- If MHA and <40 but with risk factors:
  - Smoker
  - Occupational exposures to chemicals or dyes
  - Hx radiation tx
  - Hx chemotherapy exposure
  - Analgesic abuse hx
- **These patients need full workup with cystoscopy!**

Case 2

- Does a positive urine dip = hematuria?

Case 2

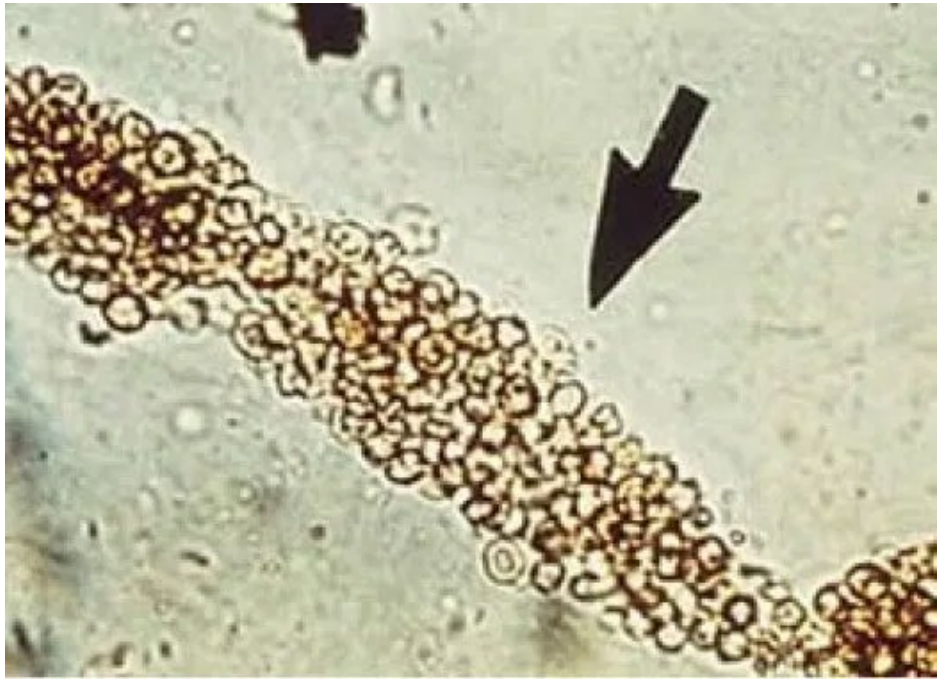
- Does a positive urine dip = hematuria?
  - No!
  - False positive causes?

Case 2

- Does a positive urine dip = hematuria?
  - No!
  - False positive causes?
    - Dehydration
    - Myoglobinuria
    - Menstrual blood contamination
    - Oxidizing agents such as Vit C
  - For assessing hematuria, **urine microscopy is the gold standard**

Case 2

- When to suspect nephrologic cause?
  - RBC casts
  - Proteinuria
  - Dysmorphic RBCs
  - Elevated Cr
- **May want to consider nephrology referral**



Case 2

- Upper tract
  - US shows 4cm left renal mass on US
- Lower tract
  - Normal cysto
  - Normal cytology



Case 2

- CT scan
  - 4 cm central renal mass
  - Ddx?



Case 2

- CT scan
  - 4 cm central renal mass
  - Ddx?
    - Renal cell carcinoma
    - Oncocytoma
    - Angiomyolipoma
    - Lymphoma
  - Solid renal mass is considered cancer unless proven otherwise!



Case 2

- Renal cell carcinoma
  - 3% of all adult malignancies
  - 90% of malignant renal tumours
  - Males:Females = 2:1
  - Risk factors
    - Smoking
    - Genetic (eg. Von Hippel Landau (VHL) syndrome)
  - Peak incidence at 40-60
  - Classic triad of flank pain, abdominal mass and hematuria now quite rare
    - Most discovered incidentally
  - Can have paraneoplastic syndromes
    - Anemia, weight loss, fever, HTN, hypercalcemia, hepatic dysfunction, polycythemia,

Case 2

- Treatment of RCC
- Localized dz:
  - Surgery
    - Radical vs partial nephrectomy (if small or bilateral tumours)
  - Percutaneous ablation (for small tumours <2-3cm and poor surgical candidate)
- Metastatic dz:
  - Palliative radiotherapy for symptomatic bony lesions
  - Immunotherapy

Case 3

- 68yoM with GHA for 2 weeks
- Was passing clots per urethra earlier on today, now unable to void for 8 hours
- 40PY smoking hx
- UA: >100 RBC/HPF



Case 3

- Do we need to investigate this patient?

Case 3

- Do we need to investigate this patient?
  - YES!
- Management and evaluation
  - Insertion of large bore 3-way foley catheter
  - Manual irrigation of bladder clots
  - Start Continuous bladder irrigation (CBI)

What is urinary catheterization?

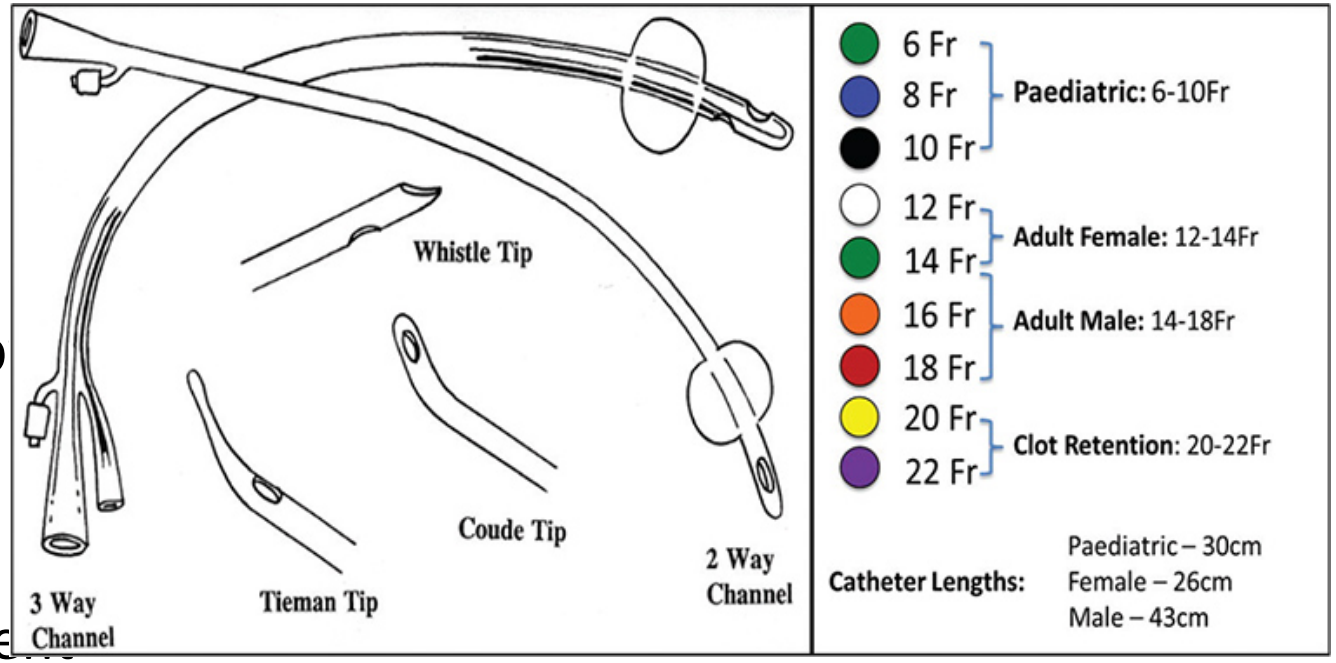
- Insertion of hollow tube into the bladder for removing urine
- It is considered a STERILE procedure, for which sterile equipment is required

Indications for urinary catheterization

1. Relieve urinary retention
2. Obtain sterile specimen from female/pediatric patient
3. Measure residual urine
4. Monitor urine output
5. To empty bladder before/during/after surgery

Catheter sizes

- The French scale is used to deno
  catheter size
  - 1 Fr = 0.33 mm roughly
  - Thus 18F = 6 mm
  - Larger catheters have more inhere
    stiffness, thus may be used to go
    across further distances (ie. Male
    urethra)
- In general:
  - 8-10F – children
  - 14-16F – Females
  - 16-20F – Males



Types of catheters

- Intermittent catheter
  - Drain the bladder temporarily for short periods
  - Patients may do this themselves
  - Can also be used with clean technique (Clean intermittent catheterization)
  - No balloon at the end of this catheter

Types of catheters

- Indwelling catheter
  - Placed in bladder and secured for a period of time
  - Has a balloon at the end of it!
    - Must inflate to keep in, must deflate to remove

Types of catheters

- Suprapubic catheter
  - Inserted into the bladder through a small incision above pubic area
  - Used for continuous drainage
  - Different types – may or may not have a balloon at the end of it!

Preparing for catheterization

- Should be used only when absolutely necessary – Is there an indication for catheterization here?
- Should be done under sterile conditions – want to reduce risks of infection!
- Equipment:
  - Catheter
  - LUBE! – use lidocaine jelly if possible (be nice!)
  - 10cc syringe
  - Sterile water
  - Cotton balls with poviodine
  - Sterile gloves
  - Urine collection bag
  - Leg strap or tape
  - Garbage bin

Catheterization

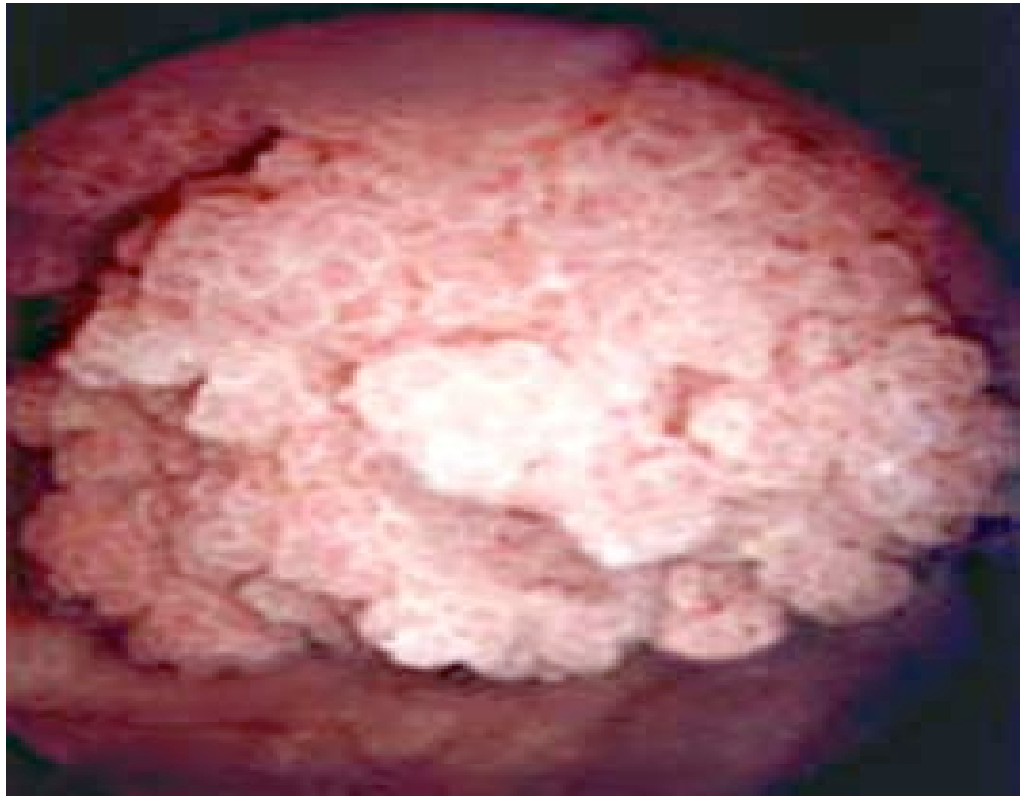
1. Explain procedure to patient
2. Provide privacy and adequate lighting
3. Positioning
    1. Female patient in dorsal frogleg position with knees to the side
        1. Place equipment between legs
    2. Male patients in supine positioning
        1. Place equipment on thighs after draped
4. WASH HANDS!
5. Open catheterization kit
6. Set up prep, open catheter, open lube
7. Place gloves on

Catheterization continued

- Grasp penis between thumb and forefinger of nondominant hand (after retracting foreskin if uncircumcised)
- Use forceps to clean the area again with cotton balls
- TRACTION – lift to ceiling
- Use LUBE
- Advance catheter into the urethral meatus (the opening) and then advance catheter in with steady pressure
- May have some resistance at the sphincter – give some time to relax
- Always advance to HUB, Wait for urine flow before inflating catheter balloon
- Then gently pull catheter until balloon is snug against bladder neck
- Connect to drainage system.

Case 3

- CT urogram
  - N upper tracts
- Urine cytology
  - Atypical cells
- Cystoscopy
  - Papillary bladder tumour

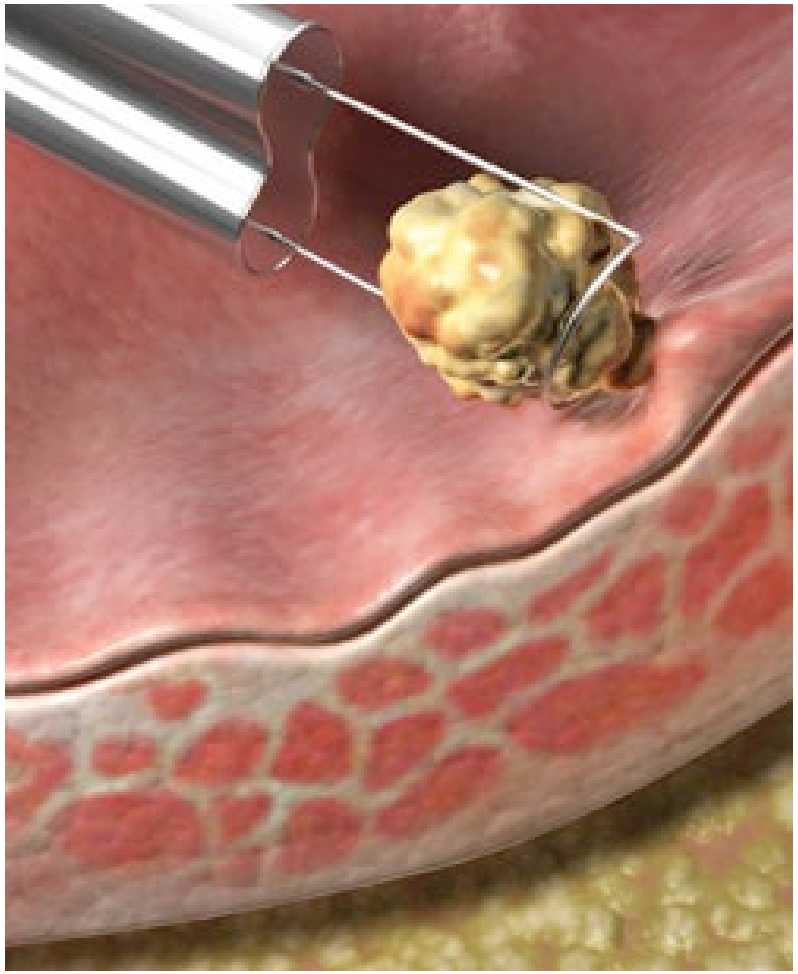


Case 3

- Bladder cancer (urothelial carcinoma)
  - Most common cause of GHA over age 40
  - Male:female = 3:1
  - Most common type of bladder tumour
    - Rarely adenocarcinoma, lymphoma, even melanoma!
  - Radiological investigations have a **high false negative rate!**
  - Needs cystoscopy to diagnose!

Case 3

- Management
  - Transurethral resection of bladder tumour (TURBT)
    - Stages the tumour (depth of invasion)
    - Completely treats tumour if early stage
  - Prone to recurrence
    - Needs routine surveillance cystoscopy
  - If high grade, non-muscle invasive bladder cancer (HGNMIBC)
    - Needs repeat TURBT – 25% chance of missed muscle invasion
    - Intravesical immunotherapy with BCG
  - If recurrent HGNMIBC
    - Repeat BCG
    - Consideration of timely radical cystectomy
  - If muscle invasive
    - Neoadjuvant chemotherapy + radical cystectomy



Case 3

- When to re-evaluate for hematuria?
  - Likelihood of tumours developing within 2-5 years after a negative evaluation is 0-3%
  - Would recommend yearly urinalysis, cytology if + hematuria, and BP checks
  - Need re-evaluation sooner if
    - Microhematuria turns into gross hematuria
    - Positive or atypical cytology
    - New onset irritative voiding symptoms without infection

Questions?



Recurrent Uncomplicated Urinary Tract Infections in Women: AUA/CUA/SUFU Guideline

TABLE 1: Guideline Definitions	
Term	**Definition**
Acute bacterial cystitis	A culture-proven infection of the urinary tract with a bacterial pathogen associated with acute-onset symptoms such as dysuria in conjunction with variable degrees of increased urinary urgency and frequency, hematuria, and new or worsening incontinence
Uncomplicated urinary tract infection	An infection of the urinary tract in a healthy patient with an anatomically and functionally normal urinary tract and no known factors that would make her susceptible to develop a UTI
Complicated urinary tract infection	An infection in a patient in which one or more complicating factors may put her at higher risk for development of a UTI and potentially decrease efficacy of therapy. Such factors include the following: • Anatomic or functional abnormality of the urinary tract (e.g., stone disease, diverticulum, neurogenic bladder) • Immunocompromised host • Multi-drug resistant bacteria
Recurrent urinary tract infection	Two separate culture-proven episodes of acute bacterial cystitis and associated symptoms within six months or three episodes within one year
Asymptomatic bacteriuria	Presence of bacteria in the urine that causes no illness or symptoms
The index patient for this guideline is an otherwise healthy adult female with an uncomplicated recurrent urinary tract infection	

Definitions

- Symptoms:
  - **Dysuria is CENTRAL in the diagnosis of UTI**; other symptoms of frequency, urgency, suprapubic pain and hematuria are variably present
  - Symptoms may be less clear in older adults – nonspecific symptoms such as dysuria, cloudy urine, vaginal dryness, vaginal/perineal burning, bladder/pelvic discomfort, urinary frequency/urgency, or incontinence may be perceived as UTIs
    - Systematic reviews have shown lack of correlation between these symptoms and presence of uropathogen on culture

Definitions

- In **those patients initially treated for uncomplicated bacterial cystitis with rapid recurrence (i.e. within 2 weeks of tx) may be reclassified as complicated** and warrant imaging and cystoscopy or other investigations

Diagnosis

- UCx is mainstay of diagnosis
  - 10^5 CFU/ml – likely an arbitrary cutoff
    - 95% of women with 10^5 CFU/ml on clean catch specimen had bacteriuria on catheterized specimen
    - Mainly asymptomatic women
  - $\geq 10^2$ CFU/ml of a single uropathogen may be more appropriate cutoff in those with strong suspicion of infection
    - Many labs don't report counds < 10^3 CFU/ml
- New molecular diagnostics show that all individuals are likely bateriuric at baseline

Antibiotic stewardship

- Uncomplicated UTI is most common indication for antimicrobial exposure in healthy women
  - reduce inappropriate treatment
  - decrease broad-spectrum antibiotic use
  - tailor treatment to shortest effective duration
- Risks of resistant bacteria, rUTIs, and progression to pyelo is enhanced by unnecessary treatment of ASB
- Minimize collateral damage
  - Nitrofurantoin, Fosfomycin, mecillinam have less impact on fecal flora vs. TMP-SMX and fluoroquinolones

Antibiotic stewardship

- Incidence of pyelonephritis in patients with uncomplicated bacterial cystitis is not different in those receiving antibiotics vs those treated with supportive care of analgesics and hydration
  - Should we utilize expectant management with analgesics while awaiting culture results more often?
  - Patients may opt for less aggressive treatments if counseled appropriately

Lifestyle changes

- Consider alternatives to barrier contraceptives and spermicidal products
  - Spermicidal products may kill lactobacillus colonization or alter vaginal microbiome
- Increase water intake >1.5L/day
  - Study showed lower likelihood of rUTI with increased water intake
- Myths:
  - Front-to-back wiping
  - Pre- and post-coital voiding
  - Avoiding hot tubs
  - Tampon use
  - Douching

Methodology

- Panel formed by AUA in collaboration with CUA and SUFU
- Research librarian conducted searches
  - Ovid MEDLINE, Cochrane, Embase
- 2 investigators independently reviewed titles and abstracts, then further screened full-text articles based on prior reviews
- Ultimately 65 studies in 67 publications were included in this review, with additional 10 pubs identified in an updated literature search
- Clinical trials were assessed using criteria for assessing risk of bias from the USPSTF
- Systematic reviews were assessed using AMSTAR 2 criteria
- Data was then given strength of evidence and subsequently linked to AUA statements linking the type of recommendation to evidence strength

TABLE 2: AUA Nomenclature Linking Statement Type to Level of Certainty, Magnitude of Benefit or Risk/Burden, and Body of Evidence Strength

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

Methodology

- Thorough peer review process was performed through AUA and additional representatives from CUA and SUFU and additional content experts
- Call for reviewers was also placed on the AUA website
- Draft guideline was distributed to 114 peer reviewers who were blinded

Guideline Statement 1

- **Clinicians should obtain a complete patient history and perform a pelvic examination in women presenting with rUTIs. (Clinical Principle)**
  - LUTS, bowel habits, recent antibiotic use, prior antibiotic related complications, catheter use, post-coital UTIs, contraception, pMHx, PSHx, vaginal bulge, dyspareuinia, severity of symptoms, hematuria
  - Determine any infectious triggers e.g intercourse, prev antimicrobials used, relationship to hormonal influences such as menstruation, menopause
  - PEx including abdominal and detailed pelvic examination

Guideline Statement 2

- **To make a diagnosis of rUTI, clinicians must document positive urine cultures associated with prior symptomatic episodes. (Clinical Principle)**
  - 2x CULTURE-PROVEN symptomatic uncomplicated cystitis episodes in 6 months or 3 within 1 year
  - Primary symptom should be DYSURIA
  - If there is lack of correlation between microbiological data and symptomatic episodes, further investigations may be warranted
    - Overlap in disorders such as IC/BPS, GSM, bladder CIS, pelvic floor muscle dysfunction

Guideline statement 3

- **Clinicians should obtain repeat urine studies when an initial urine specimen is suspect for contamination, with consideration for obtaining a catheterized specimen. (Clinical Principle)**
  - Contamination can result in suboptimal or unnecessary treatment
  - Don’t let the urine sit at room temp for >30 mins to minimize contamination
  - Expert opinion supports preparation of urethral meatus with cleaning or antiseptic solution prior to voiding

Guideline statement 4

- **Cystoscopy and upper tract imaging should not be routinely obtained in the index patient presenting with rUTI. (Expert Opinion)**
  - This is due to low yield of anatomical abnormalities
  - If patient does not respond appropriately to treatment of uncomplicated UTIs, they are considered to have a complicated UTI and these tests would be indicated
  - Cystoscopy for diverticulae, foreign body, urethral strictures
  - If risk factors, should do cystoscopy in those with UTIs and GHA
  - No mention of US as a modality for imaging, mainly mentioned IVU which may be more invasive
  - Upper tract imaging is indicated if suspicion for pyelo or hx hematuria without infection or stones

Guideline statement 5

- **Clinicians should obtain urinalysis, urine culture and sensitivity with each symptomatic acute cystitis episode prior to initiating treatment in patients with rUTIs. (Moderate Recommendation; Evidence Level: Grade C)**
  - Progression of acute cystitis to pyelo is uncommon, initiation of conservative treatments such as urinary analgesics while awaiting cx results may be reasonable
  - Does not advocate POC or dipstick analysis for rUTIs

Guideline statement 6

- **Clinicians may offer patient-initiated treatment (self-start treatment) to select rUTI patients with acute episodes while awaiting urine cultures. (Moderate Recommendation; Evidence Level: Grade C)**
  - Shared decision making with informed patients, initiation of short tx course of abx therapy may be offered for acute symptomatic episodes
  - Single dose no different than short course of daily abx
  - Patients need to understand limiting frequent or prolonged courses of abx therapy.

Guideline statement 7

- **Clinicians should omit surveillance urine testing, including urine culture, in asymptomatic patients with rUTIs. (Moderate Recommendation; Evidence Level: Grade C)**
  - Pregnant women and patients scheduled to undergo invasive urinary tract procedures do benefit from treatment
  - Other populations do not require or benefit from additional evaluation and treatment – such as patients in LTC or with DM

Guideline statement 8

- **Clinicians should not treat ASB in patients. (Strong Recommendation; Evidence Level: Grade B)**
  - Evaluation and treatment should be performed only with acute cystitis symptoms are present
  - Only recognized indications for screening/treatment of ASB are pregnancy and prior to undergoing elective urologic surgery
  - No clear evidence that identification and treatment of ASB caused by urease-producing organisms prevents struvite stone formation i.e. Proteus

Guideline statement 9

- **Clinicians should use first-line therapy (i.e., nitrofurantoin, TMP-SMX, fosfomycin) dependent on the local antibiogram for the treatment of symptomatic UTIs in women. (Strong Recommendation; Evidence Level: Grade B)**
  - Prev systematic reviews showed no differences between fluoroquinolones, B-lactams, or nitrofurantoin vs TMP-SMX in short term or long term cure.
    - no further differences when stratified by duration of treatment being 3, 7, or 10 days
  - One trial showed 5d nitrofurantoin had better clinical and microbiological resolution vs single dose Fosfomycin at 4 weeks after Tx
  - First line agents listed here had less collateral damage than second-line agents
  - Don’t use agents with >20% local resistance rates
  - Fluoroquinolone risks: QTc prolongation, tendon rupture, risk of aortic rupture (FDA black box)

Guideline statement 9

TABLE 3: First-line therapy for the treatment of uncomplicated symptomatic UTI			
Treatment effects	**Nitrofurantoin**	**TMP-SMX**	**Fosfomycin**
Cure rate	88-93%	90-100%	83-91%
Antimicrobial spectrum	narrow: *E. coli, S. saprophyticus*	typical uropathogens	Covers VRE, ESBL GNRs
Collateral damage	No	Minimal	No
Resistance	Low, stable X 50y	Increasing	Currently low
Dose & duration	100 mg BID X 5d	One DS BID X 3d	3 g single dose

Guideline statement 10

- **Clinicians should treat rUTI patients experiencing acute cystitis episodes with as short a duration of antibiotics as reasonable, generally no longer than seven days. (Moderate Recommendation; Evidence Level: Grade B)**
  - Single-dose abx associated with increased risk of short-term persistence vs short course 3-6 days
    - No differences in risk of longer term persistence, short-term symptomatic persistence, risk of reinfection
  - 3d course associated with increased risk of long-term bacteriological failure vs 5-10 days
    - No differences in risk of short-term bacteriological failure or short or long term symptomatic failure
    - 3d course was associated with decreased risk of adverse events – treat with as short of a duration as possible - <7d

Guideline statement 11

- **In patients with rUTIs experiencing acute cystitis episodes associated with urine cultures resistant to oral antibiotics, clinicians may treat with culture-directed parenteral antibiotics for as short a course as reasonable, generally no longer than seven days. (Expert Opinion)**
  - Consultation with ID would be appropriate

Guideline statement 12

- **Following discussion of the risks, benefits, and alternatives, clinicians may prescribe antibiotic prophylaxis to decrease the risk of future UTIs in women of all ages previously diagnosed with UTIs. (Moderate Recommendation; Evidence Level: Grade B)**
  - Support that antibiotics perform better than placebo, durations ranged from 6-12 months
  - Abx use increases risk of adverse events including pulmonary and hepatic toxicity with long term nitrofurantoin use, GI side effects, vaginal and oral candidiasis, rash
  - Use of fluoroquinolones not recommended as prophylaxis in current clinical practice,

Guideline statement 12

- TMP 100mg once daily
- TMP-SMX 40mg/200mg once daily
- TMP-SMX 40mg/200mg thrice weekly
- Nitrofurantoin monohydrate/macrocrystals 50mg daily
- Nitrofurantoin monohydrate/macrocrystals 100mg daily
- Cephalexin 125mg once daily
- Cephalexin 250mg once daily
- Fosfomycin 3g every 10 days

Guideline statement 12

- In women who experience UTIs temporally related to sexual activity, prophylactic abx taken prior or after intercourse is safe and associated with sig. reduction in recurrence rates.

  - TMP-SMX 40mg/200mg
  - TMP-SMX 80mg/400mg
  - Nitrofurantoin 50-100mg
  - Cephalexin 250mg

Guideline statement 13

- **Clinicians may offer cranberry prophylaxis for women with rUTIs. (Conditional Recommendation; Evidence Level: Grade C)**
  - Proposed MOI is proanthcyanidins in cranberries prevent adhesion of bacteria to urothelium
  - Cranberry was associated with decreased risk of experiencing at least 1 UTI recurrence than placebo
  - Different formulations and different concentrations available
  - Can be offered as juice and table formulations, though fruit juices may be high in sugar

Guideline statement 13

- Lactobacillus
  - No current recommendations for this due to lack of data
    - No diff between lactobacillus vaginal supps vs placebo
    - No diff between oral lactobacillus vs TMP-SMX at 12 months in terms of mean UTI recurrences
- Increased water intake
  - Increased water intake (>1.5L) associated with fewer UTI recurrences
    - 1.7 vs. 3.2 episodes
- Other methods:
  - D-mannose, methenamine, herbs/supplements (eg. Nasurtium/horseradish), intravesical hyaluronic acid, biofeedback, immunoactive tx
    - Not enough data

Guideline statement 14

- **Clinicians should not perform a post-treatment test of cure urinalysis or urine culture in asymptomatic patients. (Expert Opinion)**
  - Extrapolated from ASB literature
  - May lead to overtreatment
  - Symptom clearance should be the goal
    - If patients have rapid recurrence, further evaluation may be needed

Guideline statement 15

- **Clinicians should repeat urine cultures to guide further management when UTI symptoms persist following antimicrobial therapy. (Expert Opinion)**
  - Clinical cure normally expected within 3-7 days
  - Repeated urine culture can be performed if symptoms persist beyond 7 days

Guideline statement 16

- **In peri- and post-menopausal women with rUTIs, clinicians should recommend vaginal estrogen therapy to reduce the risk of future UTIs if there is no contraindication to estrogen therapy. (Moderate Recommendation; Evidence Level: Grade B)**
  - Multiple RCTs showed that vaginal estrogen decreased incidence and time to recurrence of UTIs in hypoestrogenic women
  - One trial evaluated estrogen cream qHS x2weeks then 2x weekly, showed decreased risk of rUTI and fewer days of abx use after 8 months
  - Low systemic absorption estrogen – **not shown to increase risk of cancer recurrence in women undergoing tx for or with personal hx of breast cancer**

Guideline statement 16

TABLE 4 Commonly used vaginal estrogen therapy		
Formulation	**Composition**	**Strength and Dosage**
Vaginal tablet	Estradiol hemihydrate*	10 mcg per day for 2 weeks, then 10 mcg 2-3 times weekly
Vaginal ring	17b-estradiol	2 mg ring released 7.5 mcg per day for 3 months (changed by patient or provider)
Vaginal cream	17b-estradiol	2 g daily for 2 weeks, then 1 g 2-3 times per week
	Conjugate equine estrogen	0.5 g daily for 2-weeks, then 0.5 g twice weekly
* Estradiol hemihydrate comes in a 4mcg tablet; however, this has not been studied for prevention of rUTI.		