

Pharmacist Learning Objectives

1. Identify the type of urinary incontinence based on symptoms.
2. List causes of transient incontinence present in inpatient and outpatient settings.
3. Describe the pathophysiology of various types of urinary incontinence.
4. Name treatment options for various types of urinary incontinence.
5. Identify the primary contraindications and adverse effects of each medication class used in the treatment of urinary incontinence.

Pharmacy Technician Objectives

1. Describe the prevalence of urinary incontinence.
2. Identify the different types of urinary incontinence.
3. List the significant causes of urinary incontinence.
4. Select the primary medications used to treat urinary incontinence.

What is Urinary Incontinence?

- Urinary incontinence (UI) is “the complaint of any involuntary loss of urine”
 - The International Continence Society

Abrams et al. *NeuroUrol Urodyn.* 2002.

Types of Incontinence

- **Stress:** involuntary leakage on effort or exertion, or on sneezing or coughing
- **Functional:** inability to get to a bathroom leads to loss of urine
- **Urge:** involuntary leakage accompanied by or immediately preceded by urgency

Abrams et al. *NeuroUrol Urodyn.* 2002.

Types of Incontinence

- **Overflow:** leakage due to an overdistended bladder, caused by bladder outlet obstruction
- **Mixed:** involuntary leakage associated with urgency and also with effort, exertion, sneezing and coughing

Abrams et al. *NeuroUrol Urodyn.* 2002.

Relevance

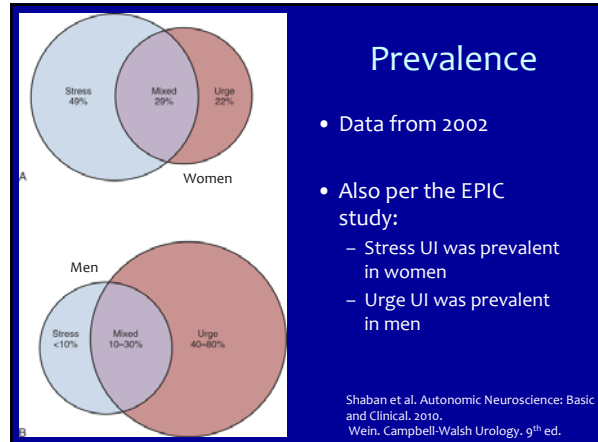
- Cost of urinary incontinence (UI) in 2000 in the U.S.
 - \$20 billion
 - \$14.2 billion on community dwellers
 - \$5.3 billion on institutional residents
 - Includes:
 - Supplies, treatment, caregiving, complications

Shaban et al. *Autonomic Neuroscience: Basic and Clinical.* 2010.
Griebling. *Clin Geriatr Med.* 2009.
Wu et al. *Obstetrics & Gynecology.* 2009.

Prevalence

- According to the EPIC study, urinary incontinence of all types is present in:
 - 5.4% of men
 - 13.7% of women

Irwin et al. European Urology. 2006.
Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.



Prevalence

- Data from 2002
- Also per the EPIC study:
 - Stress UI was prevalent in women
 - Urge UI was prevalent in men

Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.
Wein. Campbell-Walsh Urology. 9th ed.

Risk Factors

- Parity
- Obstetric factors
- Menopause
- Hysterectomy
- Obesity
- Functional impairment
- Cognitive impairment
- Smoking

*Women are more at risk

Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.

Case: RM

- RM is a 73 year old female who presents at your pharmacy and asks you where the incontinence aisle is located
 - Upon further conversation, you discover that RM just recently started having symptoms of incontinence. She asks why this has happened.
 - A. Tell her it is just a part of aging
 - B. Inquire about any recent medication changes
 - C. Advise her to talk to her doctor
 - D. Both B and C
 - E. Tell her to try a stool softener and if that doesn't work, come back and buy some incontinence pads

Prevalence

- In 2050, it is projected that the number of women with UI will increase by 55%
 - 18.3 million in 2010
 - 28.4 million in 2050
- Based on data extrapolations from NHANES and population projections from U.S Census Bureau

Wu et al. Obstetrics & Gynecology. 2009.

Prevalence in the Elderly

- Age alone is NOT a risk factor for UI
- Elderly population (over age 65):
 - 2008: 38.6 million have UI
 - 2050: 88.5 million
- Older elderly (age 85+):
 - 2008: 5.4 million
 - 2050: 19 million

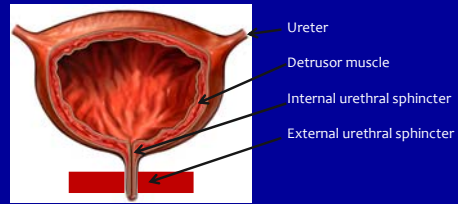
Griebling. Clin Geriatr Med. 2009.
Wu et al. Obstetrics & Gynecology. 2009.

Prevalence: Race/Ethnicity

- UI may be more prevalent in middle aged Caucasian women than African American women
 - Stress UI more common in Caucasian women
 - Odds are 2.5 times higher for Caucasian and Mexican-American women than African American women
- Urge UI more prevalent in African American and Mexican-American women

Dooley et al. The Journal of Urology. 2008.

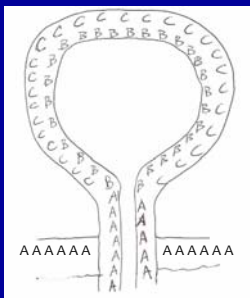
Bladder Anatomy



- * Autonomic nervous system controls the bladder and urethra
- * Somatic nervous system controls the pelvic floor muscles , external urethral sphincter

Lee et al. American Pharmacists Association Highlights. 2004.
<http://www.aurorahealthcare.org/healthgate/images/Bloo027.jpg>

Receptor Anatomy



- A= Alpha adrenergic receptors
- B= Beta adrenergic receptors
- C= Cholinergic receptors

Adapted from: Lee et al. Ameri Pharm Association Highlights. 2004.

Normal Bladder Function

- As the bladder fills, beta adrenergic receptors on the inside of the bladder wall muscle are stimulated = relaxed bladder
- Alpha adrenergic receptors in the urethra (internal sphincter) are also stimulated = contraction

Overall = urine containment

Lee et al. American Pharmacists Association Highlights. 2004.

Normal Bladder Function

- When the bladder is filling, a feedback loop causes the bladder wall muscle to contract
 - Will stop contracting if the bladder is not full
- When the bladder is full, the contractions are often and intense which causes the sphincters to relax = urination
 - However, people can control their external sphincters via voluntary contraction

Lee et al. American Pharmacists Association Highlights. 2004.

Urination

- Urine is expelled from the bladder via cholinergic stimulation of the bladder wall
 - Contractions
- Urethra is relaxed

Lee et al. American Pharmacists Association Highlights. 2004.

Types of UI

- Transient
- Chronic:
 - Stress
 - Functional
 - Urge
 - Overflow
 - Mixed

Transient Incontinence

- Delirium
- Infection
- Atrophic urethritis
- Pharmacological issues
- Psychological issues
- Excess urine output
- Restricted mobility
- Stool impaction or constipation

Lee et al. American Pharmacists Association Highlights. 2004.

New Symptoms of UI

- As an outpatient:
 - Neurological disorder
 - Malignancy
 - Multiple sclerosis
 - New medication
- Important to counsel patients to seek medical advice from their doctor
- In the hospital:
 - Post surgery
 - Analgesics
 - Post radiation
 - Restricted mobility
 - Infection

DiPiro. Rovner, et al. Urinary Incontinence.

Medications that Affect Lower Urinary Tract Function

- Diuretics
- Alpha receptor antagonists
- Alpha receptor agonists
- Calcium channel blockers
- Narcotic analgesics
- Sedative hypnotics
- Antipsychotics
- Anticholinergics
- Antidepressants (tricyclic)
- Alcohol
- ACE inhibitors

DiPiro. Rovner, et al. Urinary Incontinence.

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 - C. Advise her to talk to her doctor
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 - E. Tell her to try a stool softener and if that doesn't work, come back and buy some incontinence pads

Mechanisms of UI

- Abnormalities of:
 - The urethra
 - The bladder
 - Both
- Either overactivity or underactivity of one or both of these structures

DiPiro, Rovner, et al. Urinary Incontinence.

Differentiating Between Bladder and Urethra Issues

Bladder Overactivity:

- Frequency
- Urgency
- Nighttime issues
 - Nocturia
 - Nocturnal incontinence
- Large volume loss

Urethral Underactivity:

- Urinary leakage with activity
- No nighttime symptoms
- Small volume loss

DiPiro, Rovner, et al. Urinary Incontinence.

Clinical Presentation

Urethral underactivity:

- UI during activities such as running, sneezing, coughing, lifting
- May have frequency and urgency to compensate

Bladder overactivity:

- Frequent urination (more than 8 times a day)
- Nocturia
- Want to rule out UTI as cause of frequency

DiPiro, Rovner, et al. Urinary Incontinence.

Clinical Presentation: Opposite Issues

- Due to bladder underactivity and urethral overactivity:
 - Lower abdominal fullness
 - Hesitancy
 - Straining to void
 - Sense of incomplete bladder emptying
 - Interrupted stream

DiPiro, Rovner, et al. Urinary Incontinence.

Signs of Severe/Chronic UI

- Macerated skin
- Redness
- Ulceration
- Fungal infections

DiPiro, Rovner, et al. Urinary Incontinence.

Assessing the Problems

- Measuring the Frequency, Severity and Impact of Lower Urinary Tract Symptoms
 - Micturition (urination) time chart
 - Frequency volume chart (FVC)
 - Bladder diary

Griehling, Clin Geriatr Med. 2009.
Abrams et al. Neurourol Urodyn. 2002.

Case: RM

- RM logs her incontinence issues in a book, and takes it to her doctor. She seems to just have issues when she sneezes, which is often since she has seasonal allergies.
 - The doctor gives her a working diagnosis of:
 - A. Stress incontinence
 - B. Functional incontinence
 - C. Mixed incontinence
 - D. Urge incontinence

Stress UI

- Involuntary leakage on effort or exertion, or on sneezing or coughing
- Urethral underactivity
- Result of childbirth (damage), menopause, obesity, radical prostatectomy surgery

DiPiro, Rovner, et al. Urinary Incontinence. Abrams et al. NeuroUrol Urodyn. 2002.

Physiology of Stress UI

- Increase in intra abdominal pressure compresses the bladder
 - Forcing urine out
 - Urethral sphincter weakened
- In women:
 - Can be due to prolapse
- In men:
 - Radical prostatectomy

DiPiro, Rovner, et al. Urinary Incontinence.

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Case: RM

- Now that RM is believed to have stress urinary incontinence, she wonders what the best treatment option is for her symptoms. You tell her:
 - A. She could take pseudoephedrine
 - B. She could practice Kegel exercises and lifestyle changes
 - C. She could get surgery
 - D. She could just buy incontinence pads
 - E. She could take oral estrogens as this is probably due to atrophy

Treatment of Stress UI

- WHO does not recommend pharmacologic treatment (2002)
- Main treatment is surgery
 - Restore support
 - Can lead to urge UI after surgery/urethral erosion

Mariappan et al. European Urology. 2007.
Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.

Surgeries for Stress UI

- Available surgeries
 - Transvaginal tape, midurethral slings
 - Artificial urinary sphincter for men
 - Men can also have slings put in surgically

Mariappan et al. European Urology. 2007.
Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.

Pelvic Floor Muscle Training

- Better place to start
- Kegel exercises
 - Popularized in 1950s
 - Important behavioral therapy
 - Becoming more popular for treating men with stress UI
 - Also establishing a place in the treatment of urge UI

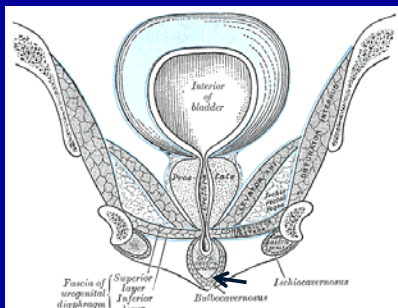
Shaban et al. Autonomic Neuroscience: Basic and Clinical. 2010.
Griebling. Clin Geriatr Med. 2009.

Kegel Exercises

- Must do correctly!
- Accidentally doing the Valsalva maneuver can increase intra-abdominal pressure
- How:
 - 3 sets of 8-12 slow contractions, each is sustained for 6-8 seconds
 - Perform 3-4 times a week for 15-20 weeks

DuBeau. UpToDate. 2009.
Griebling. Clin Geriatr Med. 2009.

Bulbocavernosus Muscle



Gray's Anatomy.

Pharmacologic Treatment of Stress UI

- Alpha adrenergics do have an effect on external sphincter
- Examples: pseudoephedrine, ephedrine, phenylpropanolamine
- Weak evidence to support their use

Alhasso et al. Cochrane Database of Systematic Reviews. 2005.
Griebling. Clin Geriatr Med. 2009.

Adrenergic Drugs for UI in Adults

- Cochrane review 2005
- Randomized or “quasi-randomized” trials with adrenergic agonist in an arm
- 22 trials, consisted of 673 women
- Results: weak evidence that adrenergic agonists are better than placebo

Alhasso et al. Cochrane Database of Systematic Reviews. 2005.

Adrenergic Agonists

- Review could not say that higher doses would have been more beneficial
- Cannot compare their efficacy with other treatments
- Adverse effects: insomnia, restlessness and increased blood pressure and heart rate, arrhythmias

Alhasso et al. Cochrane Database of Systematic Reviews. 2005.

Imipramine: Another Alternative

- Decrease bladder contractility and increase outlet resistance
- MOA: Increases serotonin and norepinephrine, reduces contractility of smooth muscle

Hunsballe et al. Urol Res. 2001.

Imipramine

- Anticholinergic effects: cause urinary retention, dry mouth, heat intolerance
- Precautions: Can cause confusion in elderly patients, orthostatic hypotension
- Also used to treat mixed and urge UI

Hunsballe et al. Urol Res. 2001.

Common Doses

- Pseudoephedrine 30-60 mg three times a day or 60 mg extended release daily
- Ephedrine 25-50 mg twice daily to four times a day
- Imipramine 25 mg at bedtime, up to 150 mg at bedtime

DiPiro, Rovner, et al. Urinary Incontinence.

Topical Estrogen

- Also used in treatment of stress UI
- Many estrogen receptors in the urethra
- MOA: Corrects atrophy, increases adrenergic receptor sensitivity (increases urethral resistance)

Rovner et al. Reviews in Urology. 2004.

Topical Estrogen

- Unopposed oral estrogen worsens UI
 - Cochrane review of 33 trials, 19313 women
 - RR 1.32 compared to placebo (95% CI 1.17-1.48)
- Opposed oral estrogen also worsens UI
 - RR 1.11 (95% CI 1.04-1.18)
- Topical estrogen improves UI
 - RR 0.74 (95% CI 0.64-0.86)
 - 1-2 less voids in 24 hours

Cody J et al. Cochrane Database of Systematic Reviews. 2009.

Dosing Info: Topical Estrogen

- Doses ranged from 1 to 3 mg daily
 - Topical cream, vaginal suppository
- Side effects: vaginal bleeding (1/4 women), breast tenderness (1/5 women)

Cody J et al. Cochrane Database of Systematic Reviews. 2009.

Duloxetine

- Duloxetine is approved for use in UI in Europe
 - Not yet approved here in the U.S.
- A serotonin and norepinephrine reuptake inhibitor (SNRI)
- MOA: increases stimulation of alpha adrenergic and serotonin receptors

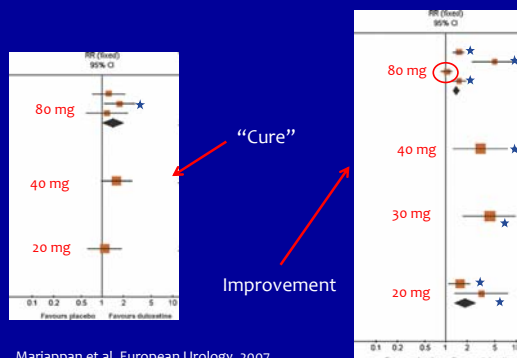
DuBeau. UpToDate. 2009.

Duloxetine: A Systematic Review

- 16 studies
- Parallel group, double blind, randomized placebo-controlled trials
- Women only
- Doses of 20, 30, 40 and 80 mg daily

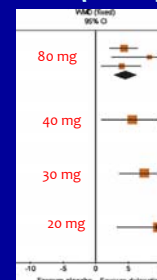
Mariappan et al. European Urology. 2007.

Duloxetine Results



Mariappan et al. European Urology. 2007.

Duloxetine: Improved Quality of Life



Mariappan et al. European Urology. 2007.

Duloxetine

- Reduction in events
 - Placebo: 41%
 - 20 mg: 54%
 - 40 mg: 59%
 - 80 mg: 64%
- Duloxetine with or without exercises was favorable to placebo or pelvic floor exercises alone

Robinson D et al. Maturitas. 2010.

Duloxetine: Drug Information

- Adverse effects:
 - Nausea (23-25%)
 - Vomiting
 - Constipation
 - Headache
 - Dry mouth
 - Fatigue
 - Dizziness
 - Insomnia
- Higher drop out rates on doses of 80 mg daily
 - 80 mg daily is conventional dosing
 - Recommended: 40 mg twice daily

Mariappan et al. European Urology. 2007.

Other Non-pharmacologic Treatments for Stress UI

- Non-pharmacological
 - Pessaries
 - Bulking agent injections
 - Weight loss for moderately or severely obese women only
 - Renessa
 - Radiofrequency waves that create scar tissue in the urethra

Robb-Nicholson. Harvard Women's Health Watch. 2009.
Griebling. Clin Geriatr Med. 2009.

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Functional UI

- Due to factors unrelated to the bladder
- Inability to get to a toilet
 - Mobility deficit
 - Cognitive deficit
- Treatment: Provide an accessible toilet replacement, or bladder training
- The problem may resolve

Griebling. Clin Geriatr Med. 2009.
DiPiro. Rovner, et al. Urinary Incontinence.

Urge Incontinence

- Sudden, undeniable need to urinate with involuntary leakage of urine
- Overactive bladder
 - Urgency ± frequency and/or nocturia
 - Frequency: voiding more than 8 times per day
 - Nocturia: waking 1 or more times per night to void
- Caused by detrusor overactivity

Abrams et al. NeuroUrol Urodyn. 2002.

Urge Incontinence Treatments

- Nonpharmacologic
 - Scheduled voiding
 - Bladder training
 - Pelvic floor muscle exercises
 - Neuromodulation

Griebling. Clin Geriatr Med. 2009.

Urge Incontinence Treatments

- Anticholinergic agents
 - Mechanism of action: block the parasympathetic acetylcholine pathway, thereby eliminating or reducing detrusor activity
 - Side effects: dry mouth, dry eyes, constipation, tachycardia, mydriasis, mental status changes
 - Other things to remember
 - Contraindicated in patients with uncontrolled narrow-angle glaucoma
 - Should not be used with cholinesterase inhibitors
 - Ex: donepezil, rivastigmine, galantamine

Lexi-Comp, Inc. Lexi-Drugs (Comp + Specialties).

Anticholinergic Agents

Generic Name	Brand Name	Usual Dose
Oxybutynin	Ditropan	2.5-5 mg po BID or TID
Oxybutynin extended release	Ditropan XL	5-15 mg po daily
Oxybutynin transdermal	Oxytrol	1 patch topically every 3 days
Oxybutynin topical gel	Gelnique	contents of 1 sachet topically daily
Tolterodine	Detrol	1-2 mg po BID
Tolterodine extended release	Detrol LA	2-4 mg po daily
Fesoterodine	Toviaz	4-8 mg po daily
Solifenacin	Vesicare	5-10 mg po daily
Darifenacin	Enablex	7.5-15 mg po daily
Trospium	Sanctura	20 mg po BID
Trospium extended release	Sanctura XR	60 mg po daily

Lexi-Comp, Inc. Lexi-Drugs (Comp + Specialties).

Which anticholinergic drug for overactive bladder symptoms in adults

- Less risk of dry mouth with tolterodine than with oxybutynin
- Less risk of dry mouth with extended release dosage forms than with immediate release

Hay-Smith et al. Cochrane Database Syst Rev. 2005.

Anticholinergic Side Effects

Generic Name	Dry Mouth	Constipation
Oxybutynin	71.4%	15.1%
Oxybutynin extended release	29 - 61%	7 - 13%
Oxybutynin transdermal	4.1 - 9.6%	3-3%
Oxybutynin topical gel	1.9 - 7.5%	1.3%
Tolterodine	30%	7%
Tolterodine extended release	23%	6%
Fesoterodine	18.8 - 34.5%	4.2 - 6%
Solifenacin	27 - 38%	13 - 16%
Darifenacin	20 - 35%	15 - 21%
Trospium	20.1%	9.6%
Trospium extended release	10.7%	8.5%

Micromedex Healthcare Series.

Patient Case

- RL is a 78yo male who resides in a nursing home. His current medications include: metoprolol, simvastatin, aspirin, donepezil, and docusate. The nurses have expressed concerns to the doctor that they are called to RL's room numerous times throughout the day and night to help him to the bathroom, and many times they get there too late. After ruling out transient incontinence, the best treatment option is:
 - a) Scheduled voiding
 - b) Oxybutynin
 - c) Tolterodine extended release
 - d) Oxybutynin transdermal

Patient Case

- RL is a 78yo male who resides in a nursing home. His current medications include: metoprolol, simvastatin, aspirin, donepezil, and docusate. The nurses have recently told the doctor that they are called to RL's room numerous times throughout the day and night to help him to the bathroom, and many times they get there too late. After ruling out transient incontinence, the best treatment option is:
 - a) Scheduled voiding
 - b) Oxybutynin
 - c) Tolterodine extended release
 - d) Oxybutynin transdermal

Overflow Incontinence

- Leakage due to an overdistended bladder
- Causes
 - Bladder outlet obstruction
 - Detrusor underactivity and incomplete bladder emptying
- Symptoms
 - Hesitancy
 - Poor and/or intermittent stream
 - Straining
 - Incomplete bladder emptying

Criebling, Clin Geriatr Med. 2009.

Overflow Incontinence Treatments

- Bladder outlet obstruction
 - Remedy cause of blockage
 - Alpha-1 blockers
 - Doxazosin, terazosin, alfuzosin, tamsulosin, silodosin
 - Mechanism of action: relax bladder neck and prostate smooth muscle
 - Side effects: orthostatic hypotension, syncope
 - Other things to remember
 - Dose should be tapered
 - Avoid concurrent use with PDE-5 inhibitors
 - Ex: sildenafil, vardenafil, tadalafil

Lexi-Comp, Inc. Lexi-Drugs (Comp + Specialties).

The effectiveness of tamsulosin in treating women with voiding difficulty

- Prospective study of female patients visiting a neurological clinic in Taiwan with a chief complaint of chronic, bothersome voiding symptoms

Chang et al. Int J Urol. 2008.

International Prostate Symptoms Score

- Voiding symptoms
 - Abdominal straining
 - Intermittency
 - Weak stream
 - Incomplete emptying
- Storage symptoms
 - Frequency
 - Urgency
 - Nocturia

Rate symptoms on a scale of 0 - 5
Total score range: 0 - 35

Mild symptoms: 0 - 7
Moderate symptoms: 8 - 19
Severe symptoms: 20 - 35

Chang et al. Int J Urol. 2008.
<http://www.auanet.org/content/guidelines-and-quality-care/clinical-guidelines.cfm?sub=bph>

The effectiveness of tamsulosin in treating women with voiding difficulty

- Exclusion criteria
 - Indwelling catheter or self-intermittent catheterization
 - Mechanical obstruction
 - Acontractile detrusor
 - Incomplete pressure-flow data
 - Concurrent use of medications that may affect voiding

Chang et al. *Int J Urol*. 2008.

The effectiveness of tamsulosin in treating women with voiding difficulty

- Patients received tamsulosin 0.2 mg daily for ≥ 6 weeks
- Adverse events were evaluated at week 2
- Therapeutic outcome was evaluated at week 6
- 97 of 103 patients were included in analysis

Chang et al. *Int J Urol*. 2008.

The effectiveness of tamsulosin in treating women with voiding difficulty

- Statistically significant improvements
 - Frequency
 - Abdominal straining, intermittency, weak stream, and incomplete emptying
 - Maximal flow rate
 - Post-void residual
 - Voiding efficiency = $\frac{\text{volume voided}}{\text{volume voided} + \text{PVR}} \times 100\%$

Chang et al. *Int J Urol*. 2008.

The effectiveness of tamsulosin in treating women with voiding difficulty

- 59.8% experienced marked or moderate improvement in voiding
- 35.1% had a good therapeutic response

Chang et al. *Int J Urol*. 2008.

Overflow Incontinence Treatments

- Bladder outlet obstruction
 - 5-Alpha reductase inhibitors
 - Finasteride, dutasteride
 - Mechanism of action: inhibit testosterone \rightarrow dihydrotestosterone
 - Side effects: erectile dysfunction, decreased libido, gynecomastia
 - Other things to remember
 - 6 months of therapy to be effective
 - Reduce PSA
 - Pregnancy Category X
 - Do not open dutasteride capsule

Lexi-Comp, Inc. Lexi-Drugs (Comp + Specialties).

Overflow Incontinence Treatments

- Detrusor underactivity
 - Theoretical treatment: cholinergic agents
 - Bethanechol
 - Mechanism of action: stimulate the parasympathetic acetylcholine pathway, thereby increasing detrusor tone and contractions
 - Side effects: excessive salivation, diarrhea, bradycardia, hypotension, flushing, miosis, bronchial constriction
 - Other things to remember
 - Contraindicated in patients with coronary artery disease, asthma, epilepsy, hyperthyroidism, Parkinson's disease, and GI disorders including peptic ulcer disease

Lexi-Comp, Inc. Lexi-Drugs (Comp + Specialties).

Clinical management of lower urinary tract symptoms with combined medical therapy

- PREDICT trial
 - 1-year study of 1000+ men with LUTS and BPH
 - Treatment groups
 - Placebo
 - Doxazosin
 - Finasteride
 - Combination therapy
 - Findings
 - Doxazosin more effective than finasteride
 - Combination therapy no better than doxazosin alone
 - Active drug regimens were well tolerated
 - Discontinuation rates due to adverse events were similar to placebo

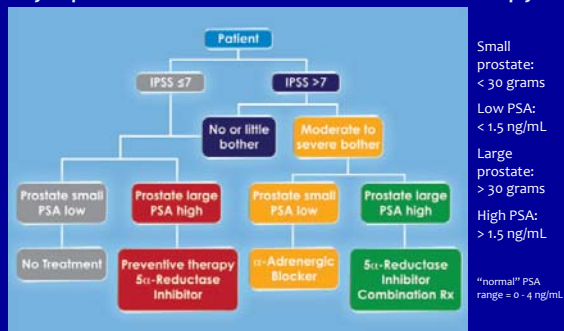
Roehrborn. *BJU Int.* 2008.
Kirby et al. *Urology.* 2003.

Clinical management of lower urinary tract symptoms with combined medical therapy

- MTOPS trial
 - 5-year study of 3000+ men
 - Treatment groups
 - Placebo
 - Doxazosin
 - Finasteride
 - Combination therapy
 - Findings
 - Combination therapy reduced the risk of clinical progression of BPH more than doxazosin or finasteride alone
 - Typical adverse effects occurred at expected rates

Roehrborn. *BJU Int.* 2008.
McConnell et al. *N Engl J Med.* 2003.

Clinical management of lower urinary tract symptoms with combined medical therapy



Roehrborn. *BJU Int.* 2008.

Mixed Incontinence

- A combination of symptoms of more than one type of urinary incontinence
 - Combo of stress and urge is most common
 - DHIC (detrusor hyperactivity with impaired contractility)

Griebling. *Clin Geriatr Med.* 2009.

Question for the Audience

- Detrusor hyperactivity with impaired contractility (DHIC) is a combination of which two types of urinary incontinence?
 - Functional + overflow
 - Stress + urge
 - Urge + overflow
 - Overflow + stress

Question for the Audience

- Detrusor hyperactivity with impaired contractility (DHIC) is a combination of which two types of urinary incontinence?
 - Functional + overflow
 - Stress + urge
 - Urge + overflow
 - Overflow + stress

Mixed Incontinence

- Initial treatment should be aimed at the predominant symptom
- Patients with mixed incontinence find their symptoms more bothersome

Griebling. *Clin Geriatr Med.* 2009.
Dooley et al. *J Urol.* 2008.

PRN Use of Medications

- No data on efficacy
- Potential explanations
 - Coverage for outings
 - Minimize side effects
 - Save money

Herbal Products

- Cornsilk
- Dandelion
- Horse tail
- Lemon balm
- Saw palmetto

Planinz. <http://www.livestrong.com/article/68643-herbs-bladder-incontinence/>

Drugs in the Pipeline

- Urinary incontinence
 - FP 1097
 - MN 246
 - TRK 130
 - Vanilloid receptor antagonists
- Overactive bladder
 - Oxybutynin vaginal, transmucosal, and transdermal gel
 - Serlopirant
 - Mirabegron
 - Botulinum toxin A
 - SMP 986
 - SVT 40776
 - Solabegron
 - hMaxi-K gene therapy
 - URG 301

<http://newmeds.phrma.org>

Thank you for your time.

Questions?