Urinary Incontinence in Women
Office Workup and Treatment

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Conflict of Interest Disclosure
Anita L. Nelson, MD

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<th>Grants/ Research</th>
<th>Agile Pharmaceutical, ContraMed, Bayer, Merck</th>
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<td>Honoraria/ Speakers Bureau</td>
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Learning Objectives
At the conclusion of this presentation, the participant will be able to:
• Describe the different types of urinary incontinence and their prevalence and impacts on women’s quality of life.
• Explain the different algorithms for testing and treatment for the most common types of incontinence.
• Counsel women on medical therapies available to control symptoms, including the efficacy and side effects.
Urinary Incontinence is Common Among Women

<table>
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<tr>
<th>Age Group</th>
<th>% with Some Involuntary Urine Loss</th>
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<tr>
<td>Young women</td>
<td>25%</td>
</tr>
<tr>
<td>Middle age perimenopausal women</td>
<td>44-57%</td>
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<tr>
<td>Older women</td>
<td>75%</td>
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- Annual direct cost of incontinence care in US $19.5 billion
- 6% of nursing home admissions of older women are due to urinary incontinence ($3 billion/year)
- Only 45% of affected women discuss with clinician
- Problems limit activities and quality of life

Types of Urinary Incontinence in Women

- **Chronic urinary retention** – involuntary loss of urine when the bladder does not empty completely; associated with high residual urine volumes
- **Coital urinary incontinence** – involuntary loss of urine with sexual intercourse
- **Continuous urinary incontinence** – continuous involuntary loss of urine
- **Extraurethral urinary incontinence** – urine leakage through channels other than the urethral meatus (e.g., vesicovaginal, urethrovaginal, or ureterovaginal genitourinary fistulas; ectopic ureter)

Types of Urinary Incontinence in Women

- **Functional urinary incontinence** – involuntary loss of urine that is due to cognitive, functional, or mobility impairments in the presence of an intact lower urinary tract system
- **Insensible urinary incontinence** – involuntary loss of urine that occurs without awareness
- **Nocturnal enuresis** – involuntary loss of urine that occurs during sleep
- **Occult stress incontinence** – stress urinary incontinence that is observed only after the reduction of coexistent pelvic organ prolapse
Types of Urinary Incontinence in Women

- **Overactive bladder** – urinary urgency, typically accompanied by frequency and nocturia, with and without urge urinary incontinence in the absence of urinary tract infection or other obvious pathology
- **Postmicturition leakage** – involuntary passage of urine after the completion of micturition
- **Postural urinary incontinence** – involuntary loss of urine associated with change of body position

Differential Diagnosis of Urinary Incontinence in Women

- **Genitourinary etiology**
  - Filling and storage disorders
  - Urodynamic stress incontinence
  - Detrusor over-activity (idiopathic)
  - Detrusor over-activity (neurogenic)
  - Mixed types

- **Fistula**
  - Vesical
  - Ureteral
  - Urethral

- **Infectious**
  - Urinary tract infection
  - Vaginitis
  - Congenital
  - Ectopic ureter
  - Epispadias

Differential Diagnosis of Urinary Incontinence in Women

- **Non-genitourinary etiology**
  - Functional
    - Neurologic
    - Cognitive
    - Psychologic
    - Physical
  - Environmental
  - Pharmacologic
  - Metabolic
Other Related Urinary Problems in Women

- Interstitial cystitis
- Pelvic prolapse/relaxation
- Recurrent UTIs

Most Common Incontinence Types

- Stress urinary incontinence: urine loss with effort or exertion or with valsalva (coughing or sneezing)
- Urgency urinary incontinence: associated with urgency or a sudden, compelling desire to void that is difficult to defer
- Mixed urinary incontinence: associated with urgency and with effort physical activity or valsalva

Most Common Types of Urinary Incontinence In Women
Prevalence of Bladder Symptoms in Early Menopausal Transition

- Cross-sectional data from prospective cohort study
- 158 women in late reproductive stage of menopausal transition
  - Mean age 48, range 44-54 years
- Most common bladder problems
  - Nocturia (72%) ≥ 1/night
  - Incontinence (50%) > 1/week
- Incontinence more prevalent in European American and Latina than African American women


Genitourinary Syndrome of Menopause (GSM)

- New terminology introduced to
  - Replace “vulvovaginal atrophy” (VVA)
  - Includes estrogen-deficiency symptoms of lower urinary tract
- Urethral meatus appears prominent relative to introitus
- Becomes vulnerable to physical irritation and trauma


Genitourinary Syndrome of Menopause (GSM)

- Urinary frequency, urgency, nocturia, dysuria and recurring urinary infections can be associated with VVA
- Urinary incontinence associated with both aging and menopause
- Women with lower urinary tract symptoms have
  - 7-fold greater risk of sexual pain disorder
  - 4-fold greater risk of sexual arousal disorder
- Recurrent UTIs affect 5-17% postmenopausal women
  - May be due to increase in residual volume and reduced urine flow

Reported Risk Factors of Bladder Symptoms

- Age related autonomic denervations
- Decreased bladder muscle tone
- Increased bladder muscle fatigue
- Diabetes
- Obesity
- Depression
- Parity
  - Parous women 3x more likely
  - Vaginal birth 2-2.4x
  - Instrumental vaginal delivery

Incontinence and Pregnancy

- 1 in 3 women reports urinary incontinence at 4 years postpartum
- Pregnancy-related risk factors
  - Hormonal, mechanical and neuromuscular changes
  - Weakening pelvic floor function
  - Instrument delivery, occipito-posterior presentation, anal sphincter injury
  - Often symptoms present prior to pregnancy
  - Incontinence in first year postpartum predicts long-term incontinence

Urinary Incontinence Following Childbirth

- 12-year longitudinal cohort study
- 7,897 of women recruited at 3 months postpartum
  - 2,944 at 6 years
  - 3,763 at 12 years (48%)
- Prevalence of persistent urinary incontinence
  - 37.9% of women overall
  - 76.4% of those who reported incontinence at 3 months, reported it at 12 years
Urinary Incontinence Following Childbirth

- Cesarean delivery only vs. any NSVD
  - OR = 0.42 (95% CI 0.33-0.54)
  - Stress or mixed incontinence reduced
  - Urge incontinence rates not reduced
- Risk factors: Older age at first birth, greater parity, overweight/obese
- Of 54 pre-menopause women with incontinence before pregnancy, 85.2% persisted for 12 years

Urinary Incontinence in Nulliparous Women

- Postal and web survey of 20,000 nulliparous Swedish women age 25-64 years
- Response rate 52%
  - 9,197 in study population
- Age and BMI important predictors
- Urinary incontinence
  - Young, normal weight: 9.7%
  - Oldest, BMI > 35: 48.4%

Urinary Incontinence in Nulliparous Women

- Urinary incontinence/leakage once/wk or more grouped according to age and body mass (BMI)


Office Evaluation of Urinary Incontinence:
Standard Elements

- History
- Urinalysis
- Physical examination
- Demonstration of stress urinary incontinence
  - Cough stress test
- Assessment of urethral mobility
- Measurement of post-void residual (PVR) urine volume
- Counselling about therapeutic objectives/goals


History Elements: Incontinence

- Incontinence characteristics: duration, precipitating events, fluid intake, frequency, impact on activities, severity, pad use
- Bladder storage: frequency, nocturia, urgency, incontinence
- Bladder emptying: hesitancy, slow stream, spray, straining to void, dysuria, incomplete emptying


Validated Questionnaires

- Urogenital Distress Inventory (UDI)¹
- Incontinence Impact questionnaire (IIQ)¹
- Questionnaire for Urinary Incontinence Diagnosis (QUID)²
- Incontinence Quality of Life Questionnaire (I-QQL)³
- Incontinence Severity Index (ISI)⁴
- International Consultation of Incontinence Questionnaire (ICIQ)⁵

History Elements: General Health

- Medical and neurological: MS, DM, stroke, lumbar disc disease
- Bowel history: anal incontinence, constipation
- Medications: diuretics, alcohol, caffeine, narcotic analgesics, anticholinergic drugs, antihistamines, psychotropic drugs, α-adrenergic blockers, α-adrenergic agonists, calcium channel blockers


Physical Examination

- Speculum exam to rule out urethral diverticulum, vaginal discharge, fistula or ectopic ureteral opening, pelvic relaxation
- Bimanual examination with pelvic floor muscle exam
  - Muscle strength
  - Voluntary muscle relaxation


Physical Examination

- Rectal exam:
  - Anal sphincter tone, prior tears, fecal impaction, tumors, fissures, hemorrhoids
- Neurologic exam:
  - Mental state
  - Sensory and motor functions of perineum and lower extremities
  - Sacral segments 2-4
  - Anal wink
  - Bulbocavernosus reflex

Bladder Diaries

- Fluid intake
- Voiding patterns and volume
- Urine leakage patterns
- Activity during leakage
- Symptoms
- 24 hour period or 3-5 days


Voiding Diary

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Measured Amount of Void</th>
<th>Did You Have Urine Leakage, Yes or No?</th>
<th>Severity of Pain Before Voiding (0-10)</th>
</tr>
</thead>
</table>


Urinalysis

- Rule out UTI
  - Clean midstream specimen or catheterized sample – dipstick
  - Urine culture needed if nitrites, leucocytes present on dipstick
  - Start empiric treatment
- If microscopic hematuria (≥ 3 RBC/HPF on microscopic evaluation of urinary sediment in absence of obvious benign cause)
  - Order cystoscopy and CT

Must Rule Out Infection: Emerging Test Technologies

- Urine is not sterile
- Urinary microbiome emerging
- Standard culture-based tests are inadequate
  - Cannot detect organisms that are anaerobic, that require special nutrients, that grow slowly or are few in number
- Two new complementary tools
  - 16S ribosomal RNA sequencing common to bacteria and eukaryocytes
  - Expanded quantitative urine culture (EQUC increased volume, different atmospheric conditions, uses longer time


Must Rule Out Infection: Emerging Test Technologies

- EQUC found that 80% of specimens showed growth
  - 92% of them would have been reported as “no growth” on usual culture
- Some specific bacteria associated with urge urinary incontinence


Cough Stress Test

- Fluid loss simultaneous with cough
  - Positive diagnostic test: stress urine loss
- Delayed fluid loss: cough-induced overactive bladder contraction
- First do supine
  - Do standing with full bladder (300 mL) if supine test
- If retrograde infusion
  - Order urodynamic testing

Urethral Mobility

- Resting angle or displacement angle of urethral-bladder neck with maximum Valsalva is ≥ 30° from horizontal
- Cotton swab in urethra is standard
- Other measurements
  - Measurement of point Aa
  - Visualization
  - Palpitation
  - Ultrasonography
  - Vaginal swab rotation?

Vaginal vs. Urethral Swab Test for Urethral Mobility

- Q-tip test can cause discomfort, even when using lidocaine gel
- 140 women randomized to urethral/vaginal or reverse order
- Outcome measures
  - Maximum straining angle from horizontal
  - Rotational angle ≥ 30°
  - Discomfort using 0-10 VAS
  - Mean rotational angles similar (24 ± 18° vs. 18 ± 16°)
  - Hypermobility based on max straining angle same
  - Hypermobility using rotational angle different
  - Discomfort higher in urethral meatus 3 vs. 0 points

Post-Void Residual Urine Volume

- ≥ 150 mL volume indicates chronic urinary retention
- May be measured by catheter drainage or bladder ultrasonography
- Repeat test if one high value obtained
- If high without prolapse – order pressure-flow urodynamic study to evaluate bladder emptying
Indication for Urodynamic Testing

- If after office testing, diagnosis is unclear
- Symptoms inconsistent with objective findings
- Failure to improve with therapy
- Prior incontinence
- Prior pelvic floor surgery

Specialized Testing: Urodynamic Testing

- Cystometry: Distend bladder to test sensitivity, capacity and compliance of bladder. Detect strength of voluntary and involuntary detrusor contraction
- Uroflowmetry and pressure-flow studies: Useful with voiding dysfunction
  - Measure rate of flow and bladder/urethral coordination
- Urethral pressure profile: If low, surgery success lower
- Electromyography: Coordination of detrusor and urethral sphincteric relaxation

Cystourethroscopy

- Endoscopic evaluation of bladder and urethra indications:
- Indications:
  - Incontinence with microscopic hematuria
  - Acute onset of refractory urgency incontinence
  - Recurrent UTI
  - Following surgery if suspect fistula or foreign body
Treatments Urinary Stress Incontinence

- Incontinence pads/products
- Kegel exercises
- Behavioral modification
- Pessary
- Surgery

Behavioral Therapies

- Fluid management
  - Voiding diary provides insights
  - Avoid nighttime fluid and coffee
- Bladder training (stress, urgency, mixed)
  - Scheduled voiding
  - Patient perception of cure high
  - Avoidance of triggers
- Pelvic floor contraction with cough or sneeze
- Urge suppressed techniques
  - Reflex
- Weight loss – each 1kg loss decreases incontinence by 3%

Pelvic Floor Exercises

- "Kegel" exercises
- ≥ 30-50 contractions/day to strengthen voluntary periurethral and perivaginal muscles
- May improve stress, urge and mixed urinary incontinence
- Objective evidence lacking
- NOT helpful if woman unable to contract pelvic floor muscles

Types of Pessaries

- Support pessaries
  - Pessaries which use a spring mechanism that rests in the posterior fornix and against the posterior aspect of the symphysis
- Space filling pessaries
  - Pessaries which maintain their position by creating suction between the pessary and vaginal wall or by providing a diameter larger than the genital opening
- Incontinence assistance pessaries
  - Pessaries which are fitted with a knob which sits underneath the symphysis pubis

Incontinence Pessaries

- Knob beneath urethrovesical junction supports against Valsalva
- May use for incontinence only

Requirements for Fitting a Pessary

- Motivated patient
- Estrogenized vaginal mucosa
- Bulky perineum
- Pessary fitting kit with variety of sizes
- Practitioner time (at least an hour)
  - Fit the pessary
  - Have the patient void
  - Teach placement and removal
- If atrophic vagina, add topical estrogen
Pessary for Incontinence

- Assess vaginal mucosa thickness, elasticity
- Assess vaginal size and pubic arch
- Measure genital hiatus
- Vaginal support
- Assess pelvic floor muscle strength

<table>
<thead>
<tr>
<th>Comparative Trials: % Satisfied</th>
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<tbody>
<tr>
<td>Randomized</td>
</tr>
<tr>
<td>6 months</td>
</tr>
<tr>
<td>1 year</td>
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Pessary for Incontinence

- Provide mechanical support under urethrovaginal junction
- Prevents descent of bladder neck when intra-abdominal pressure increases
- 95 women studied (97% leaked)
- Q-tip straining angle 57.8° to 34.4° with pessary
  - 51.6% of women correct to angle < 30°


Effectiveness of Pessary

- Urodynamic information available on 33 women

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<thead>
<tr>
<th></th>
<th>Without Pessary</th>
<th>With Pessary</th>
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<tbody>
<tr>
<td>Maximum urethral closure pressure (cm H2O)</td>
<td>52.9</td>
<td>72.6</td>
</tr>
<tr>
<td>Maximum urethral closure pressure (mL/sec)</td>
<td>14.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Average flow rate (mL/sec)</td>
<td>5.7</td>
<td>3.7</td>
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- 60% of subjects did not leak with pessary in place

Pessary Fitting

- Appropriate fit
  - At least a finger between the edge of the pessary and the vaginal mucosa
  - No pessary loss with Valsalva
  - 8-10% unable to be fit; 30% require a refit
  - No sense the pessary is in place at rest
  - Able to squat, sit down, perform usual maneuvers with comfort
  - Ability to urinate without losing pessary or having accumulating large post void residual
  - Able to place and remove (optimal)

Over-the-Counter Option for Stress Urinary Incontinence

- Poise Impressa intravaginal incontinence device
  - Disposable, nonabsorbent, flexible intravaginal device
  - Silicone core with soft, nonwoven polypropylene fabric
  - Placed using applicator like tampon
  - Provides non-obstructive support to urethra
  - Sizing kit (1, 2, 3) to determine which needed
  - Approved for up to 8 hours of wear/24 hour period
Over-the-Counter Option for Stress Urinary Incontinence

- 28 day trial
- 85% of women with urodynamically-confirmed severe SUI had > 70% leakage reduced by pad weights
- 70% reported 90% improvement on quality of life
- Tips: use water based lubricant if woman has problems introducing devices
- If woman using vaginal estrogen – place estrogen at night and use support for 8 hours during the day

Vibrance Kegel Device

- New biofeedback tool
- T-shaped device with pressure-sensitive body (detects vaginal squeeze pressure) and sheath
- Outer sheath has varying degrees of resistance for different training intensity
- Uses vibration pulse biofeedback when proper pelvic muscle contractions detected as active
- Got earlier learning, but long term same results as usual Kegel instruction
Vibrance Kegel Device


Prenatal Pelvic Floor Exercises

- Randomized controlled trial, 282 prenatal patients, starting in 2nd trimester
- Written instructions for pelvic floor exercises plus individually supervised exercise vs.
- Written instructions only
- No difference seen between two groups in
  - UI severity, prevalence of pelvic floor troubles at baseline, end of pregnancy, and 2 and 12 months postpartum


Overactive Bladder

- 29.8 million adults age ≥ 40 years have overactive bladder (OAB)
  - 17% of women; 42% of postmenopausal women
- OAB – characterized by urgency to urinate
  - Limits physical activity
- Urgency urinary incontinence – accompanies OAB
  - Negative impact on physical activity and mobility
- Secondary analysis of women with self-reported severe limitation in physical activity at baseline
  - 8 weeks trial of anticholinergic medication
  - Severe impairment 23% → 12%

Overactive Bladder Treatment

- First line therapy: behavior and lifestyle modifications — Bladder retraining, pelvic floor strengthening, restriction of bladder irritants
- Pharmacologic therapy: second line, but
  - High discontinuation rate
  - High incidence of side effects
  - Dry mouth, constipation, vision changes
- Current attention on topic due to advertising


Overview of OAB Treatment

- Exercise with heat and steam generating sheets
- Diaphragmatic, deep abdominal and pelvic floor exercises
- Pelvic floor exercises with biofeedback or verbal feedback
- Weight loss with diet and exercise
- Caffeine reduction
- 20-50% reduction in fluid intake


Overview of OAB Treatment, cont.

- Acupuncture
- Extracorporeal magnetic stimulation
- Short term posterior tibial stimulation
- Sacral neuromodulations
- Transvaginal electrical stimulation
- Multiple therapies

Behavioral Modification

- Local heat/cold over the bladder and perineum
- Avoidance of foods and fluids known to be common irritants
  - Coffee and citrus
- Bladder training with urge suppression techniques


Anti-Muscarinic Medications (Anticholinergic)

- Usually used as second line therapy for urgency urinary incontinence after behavioral therapy
  - 8.1 million using, but effect modest2
- Block parasympathetic muscarinic receptors
- Inhibit involuntary detrusor contractions
  - Acting on bladder on 2 and MS receptor
- High discontinuation rate by 6 months
- Examples: Darifenacin (Enablex), Oxybutynin (Ditropan), Solifenacin Succinate (VESIcare), Tolterodine (Detrol), and Trospium (Sanctura)


Overactive Bladder Meta-Analysis
Anticholinergic Therapy

- 27,000 women without neurogenic bladder who had participated in randomized controlled trials
- Median length – 12 weeks
- Pharmacologic agents often ineffective
- 60% of patients discontinue by 6 months

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<tr>
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<th>Episode/Day</th>
<th>Voids/Day</th>
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<tr>
<td>Baseline</td>
<td>2.79</td>
<td>11.28</td>
</tr>
<tr>
<td>Median reduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>-1.73</td>
<td>-2.06</td>
</tr>
<tr>
<td>Placebo</td>
<td>-1.06</td>
<td>-1.2</td>
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**Beta-Agonists**

- Newer agent for urgency urinary incontinence and urinary urgency and frequency
- Mirabegron (Myrbetriq) activates beta-3 adrenergic receptor in detrusor muscle
  - Relaxes muscle
  - Increases bladder capacity
- Side effects similar to placebo (tachycardia, HA)
- Not for use with uncontrolled hypertension, liver impairment


**Onabotulinumtoxin-A (Botox A)**

- Treatment for overactive bladder
  - Cystoscopic injections into detrusor muscle
  - Paralyzes muscle by inhibiting presynaptic release of acetylcholine from motor neurons at neuromuscular junction
  - 6 month trial vs. antimuscarinics – similar rates of improvement, but 27% vs. 13% had complete resolution
- Risks: Infection, urinary retention


**Other Agents to Consider**

- Intravaginal (not systemic?) estrogen decreases incontinence
- Bulking agents injected into periurethral tissue
  - Indications
    - Intrinsic sphincter deficiency
    - Failed surgery
    - Symptoms without urethral mobility
    - Older women with co-morbidities
    - Less effective than surgery in other cases
    - Will need repeat injections

Electrical Stimulation with Non-Implanted Electrodes for OAB

- Electrical stimulated aims to inhibit contractions of detrusor to reduce frequency and urgency
- Wide range of devices
- Has been shown to be more effective than placebo
- Not clear which device more effective

Percutaneous Tibial Nerve

- Place lead percutaneous to medical aspect of ankle near tibial nerve
- Stimulation of posterior tibial nerve works via S3 sacral nerve plexus to alter micturition reflex
- 100 adults with OAB (> 8 voids/day) randomized to PTNS 30 minutes/day vs. tolerodine ER 4 mg/day x 12 weeks

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<thead>
<tr>
<th>Subjective assessment of improvement</th>
<th>PTNS</th>
<th>Tolterodine</th>
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<tr>
<td>79.5%</td>
<td>54.8%</td>
<td></td>
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<tr>
<td>Mild to moderate side effects</td>
<td>15%</td>
<td>16%</td>
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Interstitial Cystitis (IC) Bladder Pain Syndrome (BPS)

- American Urological Association
- IC/BPS is an unpleasant sensation (pain, pressure, discomfort) perceived to be related to the urinary bladder, associated with lower urinary tract symptoms of more than 6 week’s duration
- In absence of infection or other identifiable causes
- Prevalence 2.7-6.5% of US women
- 3.3-7.9 million women

### O'Leary Sant Interstitial Cystitis Index

- **How often have you felt the strong need to urinate with little or no warning?**
  - Not at all
  - Less than 1 time in 5
  - Less than half the time
  - About half the time
  - More than half the time
  - Almost always

- **Have you had to urinate less than 2 hours after you finished urinating?**
  - Not at all
  - Less than 1 time in 5
  - Less than half the time
  - About half the time
  - More than half the time
  - Almost always

- **How often did you most typically get up at night to urinate?**
  - Not at all
  - Once per night
  - 2 times per night
  - 3 times per night
  - 4 times per night
  - 5 or more times per night

- **Have you ever experienced pain or burning in your bladder?**
  - Not at all
  - A few times
  - Fairly often
  - Usually
  - Almost always

### Treatments IC

- **First-line treatments**
  - General relaxation/stress management
  - Pain management – primary NSAIDs and urinary analgesics (i.e., pyridium)
  - Patient education
  - Self-care/behavioral modification

- **Second-line treatments**
  - Appropriate manual physical therapy techniques and of Kegel exercises
  - Oral: amitriptyline, cimetidine, hydroxyzine, pentosane polysulfide (Elmiron)
  - Intravesical: Dimethyl sulfoxide, heparin, lidocaine
Treatments IC

- Third-line treatments
  - Cystoscopy under anesthesia with hydrodistension
  - Pain management with care to minimize narcotic use
  - Treatment of Hunner lesions if found
- Fourth-line treatments
  - Intradetrusor botulinum toxin A
  - Neuromodulation
  - Pain management
- Fifth-line treatments
  - Cyclosporine A
  - Pain management


AUA Guidelines for Diagnosing IC/BPS

Basic assessment, including:
- History (symptoms present for ≥ 6 weeks)
- Physical examination (attention paid to pelvic floor muscles)
- Urinalysis + urine culture
- Postvoid residual (assessed either by catheter or ultrasonography)
- Voiding frequency/volume diary
- Pain evaluation

If no response to initial therapy consider:
- Referral to specialist (urogynecology/urology)
- Cystoscopy
- Urodynamics
