Urinary Incontinence

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Prevalence of Urinary Incontinence (UI)

- Involuntary loss of urine
- Multifactorial syndrome involving neurourinary pathology, age-related factors, and comorbid conditions
- Three times more common in women than men until age 80 when ~50% have episodes of incontinence and ~20% have daily incontinence
- 50 - 75% of incontinent persons never describe their symptoms to physicians
Risk Factors Associated with UI

- Forceps delivery/vaginal delivery > C-section
- Hysterectomy, prostatectomy
- Obesity
- Diabetes, stroke, COPD, cough, CHF, depression, constipation, neurologic disorders, BPH, radiation
- Estrogen depletion
- Impaired functional and mobility status
- Medications (sedatives, alpha blockers)
- Environmental barriers
Peripheral Nerves in Micturition

Diagram showing the spinal cord, hypogastric plexus, bladder, and pelvic floor musculature.

- **Spinal Cord**
  - T11
  - T12
  - L1
  - L2
  - S2
  - S3
  - S4

- **Hypogastric Plexus**

- **Bladder**

- **Pelvic Floor Musculature**

- **Urethra**

**Table: Type of Nerve and Function**

<table>
<thead>
<tr>
<th>Type of Nerve</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Parasymptathetic Cholinergic (Nervi Errigentes) Bladder contraction</td>
</tr>
<tr>
<td>B</td>
<td>Sympathetic Bladder relaxation by inhibition of parasymptathetic tone</td>
</tr>
<tr>
<td>C</td>
<td>Sympathetic Bladder relaxation (α adrenergic)</td>
</tr>
<tr>
<td>D</td>
<td>Sympathetic Bladder neck and urethral contraction (α adrenergic)</td>
</tr>
<tr>
<td>E</td>
<td>Somatic (Pudendal nerve) Contraction of pelvic floor musculature</td>
</tr>
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</table>
Lower Urinary Tract Dysfunction

Failure to store
- Hyperactive or overactive bladder
- Incompetent sphincter

Failure to empty
- Underactive bladder

Obstruction
Screening

• Ask all women who have had children and all persons aged 65 and older the following:
  • “Do you ever leak urine?”
  • “Do you ever use pads or something else to catch urine?”
Evaluation

• Duration, frequency, severity, timing
• Associated symptoms, precipitants
• Bowel and sexual function, parity, status of other medical conditions, medications, functional status
• GU history (e.g. previous anti-incontinence surgery)
Evaluation

• Bladder record
  – timing and volume (drops, small, medium and soaking) of continent and incontinent episodes
  – associated activities (coffee drinking, exercise)
  – hours of sleep
Potentially Reversible Causes of Incontinence*

- Delirium
- Infection, urinary (symptomatic)
- Atrophic urethritis/vaginitis
- Pharmaceuticals
- Psychological disorders
- Endocrine disorders/excessive urine production
- Restricted mobility
- Stool impaction

<table>
<thead>
<tr>
<th>Types of Medication</th>
<th>Potential Effects on Continence</th>
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<tbody>
<tr>
<td>Sedative/hypnotics</td>
<td>Sedation, delirium, immobility</td>
</tr>
<tr>
<td>Alcohol</td>
<td>Polyuria, frequency, urgency</td>
</tr>
<tr>
<td>Anticholinergics</td>
<td>Urinary retention, overflow incontinence, fecal impaction, delirium</td>
</tr>
<tr>
<td>- antipsychotics</td>
<td></td>
</tr>
<tr>
<td>- antidepressants</td>
<td></td>
</tr>
<tr>
<td>- antihistamines</td>
<td></td>
</tr>
<tr>
<td>Narcotic analgesics</td>
<td>Urinary retention, sedation, fecal impaction</td>
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## Medications that May Affect Continence

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<tr>
<th>Types of Medication</th>
<th>Potential Effects on Continence</th>
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<tr>
<td>• $\alpha$ - Adrenergic antagonists</td>
<td>Urethral relaxation $\rightarrow$ stress UI</td>
</tr>
<tr>
<td>• $\alpha$ - Adrenergic agonists</td>
<td>Urinary retention</td>
</tr>
<tr>
<td>• Calcium channel blockers</td>
<td></td>
</tr>
<tr>
<td>• Potent diuretics</td>
<td>Nocturnal incontinence</td>
</tr>
<tr>
<td></td>
<td>Polyuria, frequency, urgency</td>
</tr>
<tr>
<td>• ACE inhibitors</td>
<td>Drug-induced cough</td>
</tr>
</tbody>
</table>
Types of Persistent Incontinence

- Urge
  - more common in older women
- Stress
  - more common in younger women
- Mixed
  - most common overall in women
- Overflow
  - most common in men
Urge Incontinence
“"I can’t get to the bathroom on time.""

• An abrupt desire to void (urgency) that cannot be suppressed

• Usually thought due to age-related changes causing uninhibited detrusor contractions

• Other causes - bacterial cystitis, bladder tumor, bladder stones, atrophic vaginitis/urethritis, stroke, Parkinson’s disease, dementia, and in younger women-interstitial cystitis

• Especially in frail elderly, may have detrusor hyperactivity with impaired contractility (DHIC)
Stress Incontinence

“I leak urine when I cough, laugh, sneeze or when running.”

- Increases in intra-abdominal pressure overwhelm urethral sphincter
- Hypermobility of bladder neck and urethra (85% cases) - aging, hormonal changes, multiple childbirths, hysterectomy, pelvic surgery
- Intrinsic sphincter deficiency (15% cases) - previous pelvic/anti-incontinence surgery, pelvic radiation, trauma, neurogenic disorders
Overflow Incontinence
“I dribble urine most of the time.”

• Overdistension of the bladder caused by:
  – Bladder outlet obstruction –
    • Stricture, pelvic prolapse, cystocele, BPH, fecal impaction
  – Impaired detrusor contractility -
    • Diabetes, MS, lumbar spinal stenosis, spinal cord injury, medications
Functional Incontinence

- Does not involve lower urinary tract
- Result of physical (e.g. arthritis, stroke) and/or cognitive impairment
Physical Examination

• Mental status
• Mobility
• Evidence of volume overload
• Neurologic - evaluation of lumbosacral nerves, focal findings, peripheral neuropathy
• Pelvic exam - atrophic vaginitis, urethral hypermobility, cystocele, uterine prolapse, rectocele, masses
• Rectal - sphincter tone (active/resting) to assess integrity of sacral plexus ($S_2$-$S_4$), perineal sensation, fecal impaction, masses
Stress Test

• Best done when bladder is relatively full, in standing position with relaxed perineum

• Patient asked to vigorously cough once while a pad is held underneath perineum or on the floor

• In women, positive test sensitive but not specific for impaired sphincter function
Post-void Residual Volume (PVR)

- Perform within 5 minutes of voiding
- Catherization or bladder ultrasound
  - PVR < 50cc - adequate bladder emptying
  - PVR < 100cc - adequate bladder emptying > 65 years
  - PVR > 200cc - refer
Basic Laboratory Evaluation for UI

- Calcium, glucose
- BUN/Cr - especially if PVR > 200cc
- Urinalysis and culture
Urodynamic Testing

- Not routinely recommended
- Mainly used when surgery is being considered
Management of UI Overview

- Behavioral therapies
- Pharmacological therapies
- Surgery
- Pessaries
- Periurethral bulking agents
- Garments and pads
- Catheters
Behavioral Interventions

- Reduce amount and timing of fluid intake (e.g. stop at 7pm)
- Avoid bladder stimulants such as caffeine, ETOH
- Use diuretics judiciously and not before bedtime
- Elevate legs before bedtime in patients with edema
- Make toilet easier to get to - suggest bedside commode
- Lose weight if obese
### Patient Dependent Behavioral Interventions for Incontinence

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Definition</th>
<th>Effect</th>
</tr>
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<tr>
<td>Bladder retraining</td>
<td>Progressive lengthening of the voiding interval</td>
<td>20% “dry” rate 75% with 50% reduction</td>
</tr>
<tr>
<td>Pelvic muscle</td>
<td>Repetitive contraction of pelvic floor muscles</td>
<td>56-95%</td>
</tr>
<tr>
<td>(Kegel)* exercises</td>
<td>Repetitive contraction of pelvic floor muscles</td>
<td>56-95%</td>
</tr>
<tr>
<td>Biofeedback</td>
<td>Rectal or vaginal pressure recording to train patients to contract pelvic floor and relax bladder</td>
<td>54-87%</td>
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*3 sets of 8-12 contractions lasting 6-8 seconds, 3-4 x per week x 15 weeks minimum*
## Caregiver Dependent Behavioral Interventions for Incontinence

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<th>Effect</th>
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<tr>
<td>Scheduled Toileting</td>
<td>Fixed toilet schedule</td>
<td>29-85%</td>
</tr>
<tr>
<td>Habit Training</td>
<td>Toileting based on individual pattern</td>
<td>86%</td>
</tr>
<tr>
<td>Prompted voiding</td>
<td>Regular opportunities to toilet (useful in NH setting)</td>
<td>↓ 0.5-1.5 incontinent episodes</td>
</tr>
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</table>
Anticholinergic Therapy for Urge UI
Overactive Bladder Syndrome (OAB)

- Oxybutynin (Ditropan®)
  - Immediate release
  - Extended release (Ditropan XL®)
  - Transdermal patch (OXYTROL®)
- Tolterodine (Detrol®)
  - Immediate release
  - Long acting (Detrol® LA)
- Trospium (Sanctura®)
- Darifenacin (Enablex®)
- Solifenacin (VESIcare®)
- Fesoterodine (Toviaz®)
Anticholinergic Efficacy in Elders

- Oxybutynin IR
- Oxybutynin ER
- Darifenacin
- Solifenacin
- Trospium
- Tolterodine ER
- Tolterodine IR

Improvement, %

- Decreased incontinence episodes
- Decreased micturitions
- Increased volume voided

Lackner T 2006
Anticholinergic Side Effects in Elders

- Incidence, %
  - Dry mouth
  - Constipation
  - Dizziness
  - Vision disturbance
  - Somnolence
  - Pruritus

Lackner T 2006
Botulinum toxins A and B

- Direct injection into the urethral and bladder skeletal and smooth muscle results in reversible chemical denervation

- Treatment for detrusor-sphincter dyssynergia; ? BPH, overactive bladder

- Effects w/in 5-7 days, lasts 3-6 months
InterStim System

• Useful for patients with intractable symptoms of urge incontinence, urgency-frequency, or retention.

• Temporary, percutaneous sacral nerve test stimulation (S 3) and if 50% < symptoms for at least 3 days--permanent device w/implanted lead and neurostimulator, hand held programmer

• Covered by Medicare
Medications to Treat Stress Incontinence

<table>
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<tr>
<th>Medication</th>
<th>Improvement</th>
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<tr>
<td>Pseudoephedrine (Sudafed)</td>
<td>20-60%</td>
</tr>
<tr>
<td>Duloxetine</td>
<td>50%</td>
</tr>
<tr>
<td>Estrogen (topical cream, Estring®)</td>
<td>Up to 66% within 6-12 weeks</td>
</tr>
<tr>
<td>Imipramine*</td>
<td>?</td>
</tr>
</tbody>
</table>

* Dual alpha agonist/anticholinergic activity
## Stress Incontinence Procedural Interventions

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Indication</th>
<th>Imp Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retropubic (e.g., Burch)</td>
<td>Urethral hypermobility</td>
<td>80-90%</td>
</tr>
<tr>
<td>Sling procedure</td>
<td>Intrinsic sphincter deficiency</td>
<td>80%</td>
</tr>
<tr>
<td>Periurethral bulking injections</td>
<td>Intrinsic sphincter deficiency</td>
<td>50-70%</td>
</tr>
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Periurethral Bulking Agents - Stress Incontinence

• Injection of glutaraldehyde cross-linked bovine collagen or carbon-coated beads under cystoscopic guidance into an incompetent periurethral area

• UTI and transient urethral irritation are most common side effects

• Complications - urgency, UI, urinary retention

• 49% cure rate; 67% improved

Pessary Use for Stress Urinary Incontinence

- Elevates bladder neck
- Corrects the vesico-urethral angle
- Increases outflow resistance by compressing the urethra against posterio-superior aspect of pubic symphsis
Medications to Treat Overflow Incontinence

- Obstruction
  - $\alpha$ blockers (doxazosin, terazosin, tamsulosin)
  - surgery

- Acontractile bladder
  - Intermittent catheterization
Criteria for Further Evaluation

- Incontinence associated with recurrent symptomatic infection
- History of previous anti-incontinence surgery or radical pelvic surgery
- Symptomatic pelvic prolapse, pelvic pain
- Abnormal PVR > 200cc*
- Hematuria in the absence of infection
- Failure to respond to an adequate therapeutic trial or uncertainty in diagnosis

*except in known BPH and those taking relevant meds
Conclusions

• Urinary incontinence is common, especially with increasing age

• Usually multifactorial causes

• Persistent types include failure to store (urge/stress) and/or failure to empty (overflow) and mixed

• Once type identified then choose appropriate intervention

• Improvement rates with intervention are high
Resources for Patients

- The Simon Foundation [www.simonfoundation.org](http://www.simonfoundation.org)
- National Association for Continence [www.nafc.org](http://www.nafc.org)
- The AGS Foundation for Health in Aging [www.healthinaging.org](http://www.healthinaging.org)