URINARY INCONTINENCE IN WOMEN

Definition

Urinary incontinence (UI) is defined as involuntary loss of urine that is a social or hygienic problem (International Continence Society, 1973)

Magnitude of the Problem

Prevalence increasing in an aging population
- Younger women (<40 years): 28% during exercise
- Older women (>40 years): 8 to 41%
- Nursing homes: 40 to 70%
- Annual cost: $16 billion per year
- Leading cause of admission of relatives to nursing homes

Why women are at risk

- Anatomy: female urethra is very short: only 4 cm allowing easy damage to the urethral sphincteric mechanism (also allows easy access of bacteria to urinary tract, hence UTI’s are more common in women)
- Pregnancy: pressure of gravid uterus and relaxing effect of hormones on urinary sphincters increases UI during pregnancy to 33%
- Childbirth: damage to urethral supports and sphincters
- Menopause: loss of estrogen results in weaker collagen; this adversely affects the urethral supports and urinary sphincters

Risk factors

- Female: male 3:1
- Age >60 years
- Race: Caucasian, Egyptian and South Asian (Indian) women
- Pregnancy and Childbirth

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- Menopause
- Smoking: increases risk of stress and urge incontinence
- Caffeine: increases urge incontinence
- Obesity
- Pelvic organ prolapse: such as cystocele is often associated with UI (due to common causative factors such as loss of urethrovesical support from childbirth or aging) but it does not cause UI in itself. (So correction of cystocele does not correct UI!)

Types of Urinary Incontinence

Stress urinary incontinence (SUI): UI associated with increased abdominal pressure. Also called genuine stress urinary incontinence or GSUI. It is of two types:
1. Anatomic: SUI due to loss of support to the urethrovesical junction
   Common cause: childbirth
2. Intrinsic sphincter deficiency: SUI due to weakness of the urinary sphincter. Common causes: aging, prior surgery causing scarring at the bladder neck, diabetes. Leakage occurs with minimal exertion, large volume leaks. On urodynamics, abdominal leak point pressure and maximal urethral closure pressure are low.

Urge Incontinence: UI associated with an uncontrollable desire to void
   Cause: detrusor instability

Mixed Incontinence: both stress and urge incontinence is present

Continuous Incontinence: continuous leakage of urine as with a genitourinary fistula

Overflow incontinence: UI associated with overdistension of the bladder. Common causes: nerve injury after childbirth, epidural anesthesia, neurogenic diabetes, stroke, post-operative states esp. after pelvic surgery
   Presents as failure to urinate followed by dribbling of urine, and bladder is overdistended.

Screening
Ask the question!
Tell me about the problems with your bladder
Tell me about the problem you are having holding your water

History taking: Chief Complaint and HPI
- Type of UI: stress, urge, mixed, continuous, or overflow
- Severity of UI: frequency, amount, # pads/day
- Associated symptoms:
  - Frequency: r/o UTI that can cause UI or worsen mild UI
  - Voiding difficulty: such as hesitancy, or failure to empty completely. If present, it complicates the evaluation and management of UI. Anti-cholinergic medications or surgery may be contraindicated in these women.
• Fecal incontinence: associated with UI in 10-25% cases

Medical History

• Delirium, stroke: overflow UI, urge incontinence
• Immobility as with arthritis, muscle weakness: urge incontinence.
• Diabetes: associated with sphincter deficiency, neurogenic involvement in advanced causes overflow incontinence

Medications: DIURETICS: eliminating this may significantly improve UI
Anti-depressants, anti-psychotics, alpha-blockers, alpha-agonists have been shown to cause UI

Genitourinary history

• Estrogen loss (hot flushes, vaginal irritation due to atrophy): increase symptoms such as urgency and frequency
• Bowel habits: Constipation worsens UI

Surgical History
Prior anti-incontinence surgery, prolapse surgery, perhaps hysterectomy: can increase scarring at the bladder neck and cause intrinsic sphincter deficiency

Social History

• Living conditions: toilet accessibility for elderly people with limited mobility
• Fluid intake: both excessive and low intake has been shown to adversely affect UI
• Smoking, caffeine intake

General Examination

• Mental status: if impaired can cause overflow
• Mobility: if poor can cause urge incontinence
• Edema: mobilization of fluid at night can cause nocturia and urge UI
• Neurologic Exam: Look for lower limb weakness, sensory loss in lower limbs and abnormal knee and ankle jerks for neurologic causes of UI such as multiple sclerosis, stroke, neuropathies
• Abdomen: mass, ascites can cause UI by pressure effect

Pelvic and Rectal examination

• Skin condition: uriniferous odor, moist, excoriated skin
• Atrophic changes in vagina indicating estrogen loss
• Pelvic prolapse: often associated with UI (but does not cause UI)
- Pelvic muscle tone: pubococcygeus contraction (Kegel’s exercise): often weak in patients with UI
- Rectal exam: tone of rectal sphincter, stool mass
- Cough stress test on a full bladder: for objective demonstration of SUI; do only if necessary

**Voiding Diary**

<table>
<thead>
<tr>
<th>Time</th>
<th>Intake</th>
<th>Output</th>
<th>Leak</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 am</td>
<td>5 oz coffee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 am</td>
<td>3 oz</td>
<td>yes</td>
<td></td>
<td>on way to bathroom</td>
</tr>
<tr>
<td>10 am</td>
<td>3 oz</td>
<td>yes</td>
<td></td>
<td>coughing</td>
</tr>
</tbody>
</table>

Gives information on intake, output, and factors causing leakage

**Tests**

1. Measure **Post void residual volume of urine (PVR):** straight cath patient in office after she voids: This helps to rule out retention which can complicate the diagnosis and management of UI. It also provides a sterile specimen for U/A and culture.
2. **Urinalysis and culture:** straight cath or clean catch
3. **Urodynamics:** evaluation of the function of the bladder and the urethra using
   - **Cystometry:** measure the pressure-volume relationships of the bladder: detrusor contractions can be visualized for diagnosis of detrusor instability, differential diagnosis of SUl can be done by measurement of abdominal leak point pressure. In intrinsic sphincter deficiency, it is less than 60 cm of water pressure at 200 cc of water filling.
   - **Urethral pressure profilometry:** measures intraurethral pressure along the length of the urethra. In intrinsic sphincter deficiency, maximum urethral closure pressure is less than 20 cm of water pressure.
   - **Uroflowmetry:** measures urine volume voided over time: simple, non-invasive. Rules out voiding dysfunction.
4. **Cystoscopy:** to evaluate the anatomy of the bladder and urethra, and ureteric openings

**Treatment of SUI**

- Pelvic muscle rehabilitation: Kegel’s exercise with or without biofeedback
- Imipramine (combined anti-cholinergic and alpha-agonist): 10-75 mg per day: for intrinsic sphincter deficiency only. Side effects: confusion in elderly, constipation, hypertension, and dry mouth
- Surgery: - bladder neck suspension for anatomic SUI  
  - suburethral sling or collagen injection for intrinsic sphincter deficiency
**Treatment of Detrusor Instability**
- Bladder training: strategies to control urgency (deep breathing, Kegel’s), timed voiding
- Pelvic muscle rehabilitation
- Medications:
  - Oxybutinin 2.5 mg bid to 5 mg qid, Oxybutin LA: 5 or 10 mg qd
  - Tolterodine 1-2 mg BID, tolterodine LA 2 or 4 mg qd

**DIFFERENTIAL DIAGNOSIS OF URINARY INCONTINENCE**

<table>
<thead>
<tr>
<th></th>
<th>Detrusor Instability</th>
<th>Anatomic SUI</th>
<th>Intrinsic Sphincter deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic pathology</strong></td>
<td>Irritable detrusor</td>
<td>Loss of support to the urethrovesical junction (UVJ)</td>
<td>Weakness of the urethral sphincter</td>
</tr>
<tr>
<td></td>
<td>muscle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symptom</strong></td>
<td>Urge incontinence</td>
<td>SUI</td>
<td>SUI with minimal exertion, large volume leaks</td>
</tr>
<tr>
<td><strong>Exam</strong></td>
<td>No characteristic finding</td>
<td>Hypermobility of UVJ</td>
<td>Hypermobility of UVJ, fixed scarred urethra if due to prior surgery</td>
</tr>
<tr>
<td><strong>Diagnosis by Urodynamics</strong></td>
<td>Detrusor contractions on cystometry</td>
<td>Leak point pressure (&gt; 60) and maximum urethral closure pressure (&gt; 20)</td>
<td>Leak point pressure (&lt; 60) and maximum urethral closure pressure (&lt; 20)</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Pelvic muscle rehab, medications (Anticholinergics), behavioral</td>
<td>Pelvic muscle rehab, surgery, <strong>no meds!</strong></td>
<td>Pelvic muscle rehab, medications (imipramine), surgery</td>
</tr>
</tbody>
</table>