Urinary Incontinence: From Wet to Dry
Easy as 1, 2, 3....

Rebecca Jackson, MD
Obstetrics, Gynecology, & Reproductive Sciences,
Epidemiology & Biostatistics
University of California, San Francisco
Preview: 3 steps

1. Simple Diagnosis
2. Simple behavior change
3. Drug treatment (or surgery) (emphasis on overactive bladder)
Kawaihae Harbor: Lunch fish truck

**LUNCH WAGON MENU**

- Fresh Fish Plate or Hamburger Steak Plate: $9.00
- Choice of Rice or French Fries and Salad: $9.00
- Fish prepared 4 ways: Baked, Broiled, Fried, or Crock Pot. Fish comes with fries and a drink: $7.00
- Fish Burger or Cheeseburger: $6.00
- Deluxe Burger includes French Fries or Salad: $8.00
- Fish and French Fries or Salad: $7.00
- Side Salads - Green, Ceaser, or Macaroni: $3.00
- Deluxe Salads - Green or Ceaser: $6.00
- Beverages - Soda, Juice, Ice Tea, or Water: $1.00
- Daily Specials: $9.00

Cash only, Mahalo!
URINARY INCONTINENCE

- Common (but often undiagnosed)
  - 25% reproductive age women
  - 40% postmenopausal women
- Chronic
  - Social seclusion
  - 3x Nursing home admits
- Costly
  - $26 billion annually
<table>
<thead>
<tr>
<th></th>
<th>Stress</th>
<th>Urge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitant</td>
<td>activity</td>
<td>urgency</td>
</tr>
<tr>
<td>Timing</td>
<td>immediate</td>
<td></td>
</tr>
<tr>
<td>delayed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount</td>
<td>small-mod</td>
<td>large</td>
</tr>
<tr>
<td>Frequency, nocturia</td>
<td>common</td>
<td>rare</td>
</tr>
<tr>
<td>common</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Overflow – uncommon in women, assoc with over-distension of bladder due to neurologic cause or obstruction (pelvic organ prolapse)*
### Risk factors in elderly women: Stress vs. Urge

<table>
<thead>
<tr>
<th>Factor</th>
<th>Stress</th>
<th>Urge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>3x increase</td>
<td>4x increase</td>
</tr>
<tr>
<td>Estrogen</td>
<td>1.7 ↑</td>
<td>2x ↑</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1.6 ↑</td>
<td>1.6 ↑</td>
</tr>
<tr>
<td>Diabetes</td>
<td>--</td>
<td>3.2 ↑</td>
</tr>
<tr>
<td>Depression</td>
<td>NS ↑</td>
<td>2.8 ↑</td>
</tr>
<tr>
<td>Age</td>
<td>--</td>
<td>1.6 ↑</td>
</tr>
<tr>
<td>↓ functional status</td>
<td>--</td>
<td>1.3 ↑</td>
</tr>
<tr>
<td>COPD (smoking)</td>
<td>5.5 ↑</td>
<td>--</td>
</tr>
<tr>
<td>Overweight</td>
<td>1.3 ↑ (per 5 kg/m²)</td>
<td>--</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>NS ↑</td>
<td>--</td>
</tr>
</tbody>
</table>

Jackson, 2004
“Overactive Bladder (OAB)”

• Definition: Can be wet or dry (1:2 ratio) with:
  1. frequency
  2. urgency
  3. nocturia

• OAB causes similar degrees of impact on QOL as incontinence and is equally improved by treatment

Etiology of urinary incontinence

- urinary tract infection (stress/urge)
- support defects (stress)
- detrusor instability (urge)
- pharmacologic (stress/overflow/urge)
- neurologic (stress/overflow/urge)
- anatomic bypass: (fistula, diverticulum)
- other: neoplasm, radiation, immobility, dementia
History

- 3 IQ’s (incontinence questions)
- Assoc urinary sx: hematuria, dysuria, frequency, urgency, nocturia
- Drinking/Voiding Habits (Urinary diary)
- Medical, surgical, ***meds***
- Fecal Incontinence, constipation
- Neurologic Sx
- Severity: 3 P’s
3 Incontinence Questions (3IQ)

1. During the last 3 months, have you leaked urine, even a small amount? **If yes:**

2. Did it occur with:
   - physical activity, coughing, sneezing, lifting, or exercise (stress)
   - urge, ie feeling the need to empty but could not get to the toilet fast enough
   - Other or Don’t know

3. Which type of UI do you have **MOST OFTEN**: Stress, Urge, Mixed (50/50), Other
### Accuracy of 3 IQ Compared to Extended Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity ($\text{Sensitivity}$)</th>
<th>Specificity ($\text{Specificity}$)</th>
<th>PPV ($\text{PPV}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urge</strong></td>
<td>3IQ</td>
<td>0.75</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>3IQ</td>
<td>0.77</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Stress</strong></td>
<td>3IQ</td>
<td>0.86</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>3IQ</td>
<td>0.60</td>
<td>0.74</td>
</tr>
</tbody>
</table>
Ms. I. Gotta Go is a 60 yo teacher GOP0:
I have a hard time waiting until the end a class to go to the bathroom and usually have to run to get there. Almost every day I leak on the way to the bathroom. When I have a severe cough, I may leak also but that occurs rarely.
And the diagnosis is?

1. Stress UI
2. Urge UI
3. Mixed UI
4. Other UI
Incontinence Severity: 3 P’s

- Provocation (3 IQs)
- Protection
- Problem

Use to decide whether to treat and to evaluate effectiveness of treatment
Urinary Diary

- Simple form for recording voids, incontinent episodes, fluid intake
- Can be therapeutic by itself (increases awareness)
- Very useful in planning therapy
  - fluid adjustment
  - timing and type of medications
<table>
<thead>
<tr>
<th>TIME</th>
<th>URINATE IN TOILET</th>
<th>LEAKING ACCIDENT</th>
<th>REASON FOR ACCIDENT</th>
<th>FLUID TYPE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 a.m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 a.m.</td>
<td>X X</td>
<td></td>
<td></td>
<td>Tea</td>
<td>1 cup</td>
</tr>
<tr>
<td>8 a.m.</td>
<td></td>
<td>X</td>
<td>Sudden Urge</td>
<td>OJ</td>
<td>4 oz.</td>
</tr>
<tr>
<td>9 a.m.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 a.m.</td>
<td>X</td>
<td></td>
<td></td>
<td>Water</td>
<td>8 oz.</td>
</tr>
<tr>
<td>11 a.m.</td>
<td>X</td>
<td>X</td>
<td>Cough</td>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>12 noon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 p.m.</td>
<td></td>
<td>X</td>
<td></td>
<td>Coffee</td>
<td>1 cup</td>
</tr>
<tr>
<td>2 p.m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 p.m.</td>
<td>X X</td>
<td>X</td>
<td>On my way to bathroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 p.m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 p.m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pharmacologic causes of incontinence

• via urethral relaxation (prazosin, terazosin, aldomet; phenothiazines; benzodiazepines)

• via altered intravesical pressure (diuretics; Dementia rx: Aricept, Reminyl, Exelon; anticholinergics; anti-Parkinson drugs, benztropine; B-blockers; disopyramide)

• via indirect effects: (ACE inhibitors, enalapril (cough); Iron, narcotics (constipation); ETOH, sedatives, anxiolytics (relaxation)

• via unknown mechanism: oral
Hormone Therapy for UI?

- Oral estrogen (without progestin) in women with UI: Cochrane review, 5 trials N=6161: worse UI (RR 1.32 (1.17-1.48))
- Oral E+P in women with UI: worse UI (RR 1.11 (1.04-1.18))
- Oral E+P in women without UI: Increase in new UI (RR 1.39 to 1.52)
- Topical Estrogen: 4 trials, N=213, mixed types of pts, one with intravesical admin: Improved UI (RR 0.74, 0.64-0.86)
A 62 year old woman with hypertension presents with worsening incontinence over the last several years. She now leaks nearly every day and has nocturia 4 times per night. “I just can’t get to the bathroom fast enough.”

What work up is necessary prior to beginning treatment? (mark all that apply)
Work-up of Urge UI prior to treatment....

1. Urodynamic testing
2. Post-void residual
3. Cough stress test
4. UA or Urine culture
5. Neurologic exam
6. Pelvic exam
7. History (including medication history)
Work-up of Urge UI prior to treatment:

1. Urodynamic testing
2. Post-void residual
3. Cough stress test
4. UA or Urine culture
5. Neurologic exam
6. Pelvic exam
7. History (including medication history)
Physical Examination

Unclear which (if any) of these is necessary prior to beginning treatment.....Goal is to rule out overflow incontinence, UTI

- **Neurologic (S2-S4)**
  - lower extremity strength, sensation, reflexes, anal wink

- **Pelvic exam**
  - pelvic organ prolapse
  - muscle strength (can teach Kegel)
  - post void residual (should be <150cc) *Maybe
  - urinalysis (or culture) *** Yes
Further Workup: Urodynamics...?

- Few recommend use
  - Urodynamic Society does
- Poor reproducibility, costly, painful
- Does it affect clinical decisions or improve outcome?
  - RCT: No difference in outcome Holte Dahl 2000

**Bottom line:** Urodynamics unnecessary (except as part of surgical planning)
Summary: Step 1 - Diagnosis

- Simple clinical diagnosis (urge vs stress vs mixed) using 3 IQ
- Good medication history
- Severity: 3P’s
- Rule out UTI
- Give urinary diary

Now on to treatment.....
INCONTINENCE HOT LINE

PLEASE HOLD!

© Original Artist
# Incontinence and Fractures

Prospective cohort of 6049 elderly women for 3 yrs, 11869 (55%) falls, 514 (8.5%) fractures

<table>
<thead>
<tr>
<th>Falls</th>
<th>Risk</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urge Incont</td>
<td>26%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Stress Incont</td>
<td>6%</td>
<td>0.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fractures</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Urge Incont</td>
<td>34%</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Stress Incont</td>
<td>1%</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Study of Fractures (SOF) Brown, 2000
Rationale: Urge UI → Falls

- Overactive Bladder (OAB)
  - urgency - rush to bathroom
  - frequency - often
  - nocturia - in the dark while sleepy

- Treatment of OAB improves
  - incontinence, and
  - urgency, frequency, nocturia

- Potential to ↓ falls & fractures

Bottom line: Treat OAB, bedside commode for elderly

Brown JAGS 2000
Treatments

- Education
- Behavioral
- Medicines
- Surgery

Urge and Stress

Mostly OAB & urge

Stress
## Step 2: Behavioral Measures for treatment of UI and OAB

<table>
<thead>
<tr>
<th>INS</th>
<th>OUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1.5 liter/day fluid intake (= six x 8 oz.)</td>
<td>• Bladder retraining (Timed voids)</td>
</tr>
<tr>
<td>• Avoid irritants (caffeine, acids, spices)</td>
<td>• Double voiding</td>
</tr>
<tr>
<td>• Weight reduction</td>
<td>• Bedside commode</td>
</tr>
<tr>
<td></td>
<td>• Kegel’s</td>
</tr>
<tr>
<td></td>
<td>• Cough UP</td>
</tr>
<tr>
<td></td>
<td>• Urge Suppression exercises</td>
</tr>
</tbody>
</table>

Other: Treatment of constipation, cough
The power of information

- RCT of 222 women with Urge UI
  - Improved
- Biofeedback 63%
- Verbal/vaginal instruct 69%
- Self-help booklet 59%
  - Not statistically different

Bottom line: Educate & Empower!

Burgio JAMA 2002
Bladder training

1. Education

2. Scheduled voiding (q 1-3 hours or shorter as indicated by diary)

3. Slowly increase interval by 15-30 minutes until get to 3-4 hours
Urge Suppression exercises

- Stop (don’t panic)
- Squeeze (5-10 Kegels)
- Relax (breathe, visualize)
- Go (to the bathroom slowly, calmly)

Fantl, JAMA, 1991
Successful Pelvic Floor Exercises

- Strengthen levator ani and sphincter
- Confirm correct (only 1/2 do correctly): two fingers in the vagina, one hand on the abdomen
- Daily: 3 sets of 10 contractions sustained for 10 seconds each, for at least 4-5 months
Weight Reduction & UI

- RCT of weight loss in overweight/obese women (Subak, NEJM, 2002)
  - Avg weight loss 8kg
  - 50% decrease in UI (stress > urge)

- Diabetes Prevention Program trial:
  - Lifestyle intervention: wt loss 3 kg
  - 25% decrease in weekly UI (stress > urge)

Brown, Diabetes Care, 2006
Step 2 Summary: Simple behavior change

- Avoid bladder irritants, excessive fluid intake
- Bladder re-training with timed voids
- Urge suppression
- Kegels
- Lose weight
Behavioral VERSUS Meds (urge UI)

197 women with Urge UI; RCT

- Biofeedback/behavioral: 81%
- Medication: 69%
- Placebo: 40%

Greater satisfaction in behavioral group

Bottom line: Educate & Empower
Hikes

- Pololu valley—end of the highway past Hawi
- 25 minutes down to black sand beach
- Can continue further to next valley (need boots, cross stream)
Step 3: Medications

- **Initial treatment (Step 2)** same for urge and stress (Kegels, bladder training)
- **Urge**: behavioral plus medications, never surgery. Typically anticholinergics.
- **Stress**: behavioral plus surgery (occasionally meds (tricyclics, newer SNRI=Duloxetine))
Anticholinergics for OAB

1. Old Standbys:
   - Propantheline Br
   - Oxybutynin (Ditropan)
   - Imipramine

2. Second Generation:
   - Tolterodine (Detrol and XL)
   - Ditropan XL
   - Oxytrol (transdermal oxybutynin)

3. Third Generation:
   - Trospium CI (Sanctura)
   - Darifenacin (Enablex)
   - Solifenacin (Vesicare)
   - Fesoterodine (Toviaz)
Okay, sir... will that be a window, an aisle, or a bathroom seat?
<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Drug</th>
<th>Placebo</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective Cure/Improvement</td>
<td>40-60%</td>
<td>20-40%</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>32%</td>
<td>14%</td>
<td>NS</td>
</tr>
</tbody>
</table>

32 trials; N=6800; **Meds very similar**  
Herbison 2003
## OAB Medications

<table>
<thead>
<tr>
<th>IMPROVED OAB</th>
<th>SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased urgency</td>
<td>Dry mouth (20-45%)</td>
</tr>
<tr>
<td>Decreased frequency</td>
<td>Constipation (5-10%)</td>
</tr>
<tr>
<td>Decreased incontinence only?</td>
<td>CNS effects (elderly, oxy)</td>
</tr>
<tr>
<td>Decreased nocturia</td>
<td>(memory, blurry vision,</td>
</tr>
<tr>
<td></td>
<td>dizziness)</td>
</tr>
</tbody>
</table>

**Contraindications:** narrow angle glaucoma, hepatic/renal disease
4 New Meds for OAB

- Darifenacin (Enablex)
- Solifenacina (Vesicare)
- Trospium (Sanctura)
- Fesoterodine (Toviaz)
New Meds for OAB

Differ in terms of:

- **Quaternary vs tertiary amines**
  (quaternary don’t cross BBB, also harder to absorb in GI tract)

- **Muscarinic receptor selectivity**
  (M3 in bladder & salivary glands, M1 in CNS, M2 in heart)

- **Metabolism**: via p450 or not

- **Excretion**: active metabolites (better availability to bladder)
<table>
<thead>
<tr>
<th></th>
<th>+</th>
<th>-</th>
<th>Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oxybutynin (Ditropan)</strong></td>
<td>Cheap Quick acting</td>
<td>Dry mouth 45% Memory</td>
<td>M1 + M3 Tertiary, p450</td>
</tr>
<tr>
<td><strong>Tolterodine &amp; Fesoterodine</strong></td>
<td>Less dry mouth</td>
<td>Increased QT ? Memory</td>
<td>Nonselective, Tertiary, p 450</td>
</tr>
<tr>
<td><strong>Darifenacin (Enablex)</strong></td>
<td>Unlikely to affect CNS, heart</td>
<td>? increased constipation</td>
<td>Highly M3 Tertiary, p450</td>
</tr>
<tr>
<td><strong>Solifenacin (Vesicicare)</strong></td>
<td>? Less dry mouth ? CNS, heart</td>
<td>? Less constipation</td>
<td>Less highly M3 Tertiary, p450</td>
</tr>
<tr>
<td><strong>Trospium (Sanctura)</strong></td>
<td>Avail &gt;20 yrs in Europe and safe Should not cross BBB</td>
<td>Poor GI absorption</td>
<td>Nonselective, Quaternary, Not p450, excreted unchanged</td>
</tr>
</tbody>
</table>
Kawaihae Harbor (2 miles)

creative island cuisine
Serving you since 1988

Our menu features fresh local seafood, exotic pizzas, colorful eclectic salads and Asian inspired pastas and risottos...

Kauai
Oahu
Molokai
Lanai
Maui
Kawaihae
Hilo
OAB Medications in elderly

**SIDE EFFECTS**

- Elderly
- On other anticholinergics
- Multiple med probs

**IMPROVED OAB**

- Decreased urgency
- Decreased frequency
- Decreased incontinence only?
- Decreased nocturia dizziness

- Dry mouth (20-45%)
- Constipation (5-10%)
- CNS effects (elderly, oxy
  memory, blurry vision,)

- Increased QT
Anticholinergics and Cognitive Function

- **RCT**: Darifenacin (Enablex) vs Ditropan XL vs Placebo in >60 yo’s

- **Outcome**: Name face association test

- **Results**:
  - Darifenacin: no significant effects on memory
  - Ditropan XL: significant memory decrease equivalent to aging of 10 years.

Which is the best drug for OAB?

- Very few head to head trials exist
- Those that do are often not ideal comparisons
- Oxybutynin (IR) is least well tolerated (dry mouth) but is 1/6 the price of all other drugs ($13-19/month versus $120-
Which is the best drug for OAB?

- Extended release formulations have fewer side effects
- Lower doses often are effective and have fewer side effects
- No sig difference between oxybutynin and tolterodine (Detrol) but less dry mouth with tolterodine

Hay-Smith, Cochrane Database of Systematic Reviews 2008.
Which is the best drug for OAB?

- Solifenacin 5/10mg vs. tolterodine (Detrol) 4mg: 1 fewer urge episode/day
- Darifenacin (Enablex) vs oxybutynin: No sig difference but less dry mouth

Prescribing guide: OAB

- **Start**: 2.5 mg oxybutynin (1/2 pill) qd and increase slowly every 2 wks up to 20 mg/day in divided doses. (Extended release, ER: start 5mg/day up to 20mg/day, less dry mouth)

- **If ineffective or can’t tolerate**: try lowest dose of one of other meds and go up prn
Prescribing guide: OAB (cont’d)

• If elderly or impaired cognitive function: Do not use oxybutynin or tolterodene. Choose one of new drugs (Darifenacin (Enablex), Solifenacin (Vesicare), Trospium (Sanctura))

• If on multiple meds: consider trospium (Sanctura) to avoid drug interactions via p450 metabolism
Norio's Japanese Restaurant &
Sushi Bar at the Fairmont Orchid
Stress UI Medications

- Medications less effective compared to treatment for urge. Start with behavioral change.

- **Tricyclics** - 25-150mg QD (have alpha-adrenergic effect on urethra)

- **Alpha-adrenergics**: marginally effective, used rarely due to adverse effects

- **Duloxetine**: SSRI/nor-epi reuptake inhibitor. 2 recent RCT’s
Duloxetine (A “SNRI”)

- Increase activity at 5HT-2 and α-1 receptors
- Antidepressant; Off-label use for stress UI, main side effect=nausea (25%)
- Cochrane review 2009: 4 trials, 1733 pts
  - Improved UI (RR 0.74) → modest effect
Surgery for stress UI

- Reserve for those who have failed behavioral therapy and whose QOL is impacted
- Various procedures available. All about 70-80% effective at 5 years
- Risk of recurrence increases over time
Devices?

- Urethral devices (FemAssist, FemSoft)
- Vaginal devices (Pessaries, Contiform, Contiguard)
- Useful in a few patients but limited by discomfort, UTI’s, embarrassment, and placement difficulty
Wet to dry....

1. Simple diagnosis (3IQ’s)
2. Simple behavioral changes for both urge and stress (Kegel + bladder retraining)
3. Add anticholinergic for urge/OAB as necessary

Educate & Empower!
Hikes

- Ocean-side trail from Hapuna Prince to Mauna Kea ~1 mile
- Beachside restaurant open
- Parrots by the tennis courts