NEW DEVELOPMENTS IN HYPERTENSION

What Can We Do to Prevent Dementia, Osteoporosis and Urinary Dysfunction

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Declaration of full disclosure: No conflict of interest

Summary of Topics
➢ Shift of paradigm in caring for older or frail patients: Geriatrics Principles
➢ Medications overuse and avoidance
➢ Recognition, management and prevention of Dementia
➢ Falls: Risk and prevention
➢ Osteoporosis
➢ Urinary Dysfunction

Geriatric Principles
• Focus on quality of life and not on quantity or prolongation
• Comorbidity: Multiple chronic diseases and symptoms
• Functional Status should be a vital sign
• Cognitive Status affects all of us
• Care across settings (Home/hospital/Skilled Nursing Facility) and Long term care options
• Palliative Care and symptom management

Functional and Cognitive Status
• The holy grail of Geriatrics: The end outcome of all diseases
• Diseases matter to the extent they impact functional status
• How do functional and cognitive status impact natural history and outcomes of the condition
• What is the impact of the condition on ADL, IADL, cognitive function?
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ADL and IADL Status in All

- Activities of Daily Living: dress, transfer, toilet needs, bathing, feeding
- Patients in long-term care institutions almost always have ≥2 ADL limitations
- Instrumental Activities of Daily Living: manage own finances, transportation within community, shopping for food/clothing, preparation, use of phone or computer, housework, handle own meds

Physical and Cognitive Function

- Use of functional status measures in clinical practice as routine practice
- Measurement of gait speed predicts falls risk and morbidity/mortality
- Get up and Go Test
- Evaluate cognitive status
- Establish decision-maker for goals of care and teach communication about issues
- Use functional status as a target of therapy: prevent ADL disability or delirium

Care Across Settings and Options for Long Term Care

- Care transitions often disastrous for elders
- Hospital-home; hospital-SNF; SNF-hospital
- Interventions to improve care transitions
- Long term care not just nursing homes
- Family caregivers
- Other informal care
- Assisted living
- Evaluate personal finances

Palliative Care and Symptom Management

- End of life care and hospice are underused for virtually any clinical problem
- Palliative Care is focused on improving symptoms, well being, and quality of life
- Should be present throughout the course of serious illness
- Focus on major sources of distress including patient perspective
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### Medication Management

- 90% take medications every day and 46% take 5 or more
- 54% have more than one clinician prescribing and 35% use >1 pharmacy
- Over 50% of all prescribed drugs
- Half do not take all medications as prescribed
- Up to 60% of outpatients have medications considered suboptimal

### Appropriate Medication Management in Geriatrics Medicine

- 90% take medications every day and 46% take 5 or more
- 54% have more than one clinician prescribing and 35% use >1 pharmacy
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- Up to 60% of outpatients have medications considered suboptimal

### Adverse Drug Effects are Common

- 25% of outpatient practices report
- About 10% to 17% of hospital admissions are due to ADE
- Increase in ADE is disproportionately affecting elderly: 20% of all ADEs
- Greatest predictor of ADE is the total number of prescribed meds

### Beers Criteria 2012+

- Goal to reduce inappropriate medications
- Beers meds linked to ADE, hospitalization, delirium, falls, GI bleed
- 53 classes of medications listed in 3 categories:
  - Avoid regardless
  - Inappropriate with certain diseases or syndromes
  - Use with caution

- www.americangeriatrics.org
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### Cognitive Impairment or Dementia or Neurocognitive Disorders

#### Cognitive Impairment Clinical Case

EM is a 67 year-old woman with a h/o high blood pressure. Brought in by husband who is reporting that patient’s personality has changed over the last year. She is becoming more suspicious, and at times talks and “doesn’t make sense”. She is paranoid about the neighbors.

### Prevalence Cognitive Impairment

- AD estimated prevalence 24.3 million world-wide in 2001
- Predicted rise to 42.3 million in 2020
- 81.1 million by 2040
- Lifetime risk of dementia after age 65 is 17-20%
- Costs $150 billion/yr


### Risk Factors for Cognitive Impairment

- Increasing Age
- Down’s syndrome
- Head trauma/Traumatic Brain Injury
- Fewer years of formal education
- Female sex
- Family history of Alzheimer
- Vascular Disease risk factors
- Cerebrovascular events – strokes
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Pathophysiology of AD
- Neuritic plaques
- Amyloid precursor protein cleaved
- Makes beta amyloid protein
- Accumulation initiates cell death
- Neurofibrillary tangles
  - filaments of abnormally phosphorylated tau protein
- Loss of neurons
  - Cholinergic, noradrenergic, serotonergic neurotransmitters
- Is it amyloid deposition that kills neurons OR are neurons being damaged by something else?

Clinical Presentation of Dementia
- Cognitive changes
- Personality changes
- Changes in day-to-day functioning
- Activities that require calculation or planning first to be impaired
- Psychiatric symptoms
- Problem Behaviors
- Ask caregivers, family and friends

Rapid Screening for Cognitive Impairment
- Routine screening not recommended
- Use as indicated as diagnostic screen
- Verbal Fluency Test: Sensitivity 88%; specificity 96%; takes One minute
- Ask patient to name as many animals as possible in one minute
  - 1 point/animal
  - Score <15 suggestive of dementia
  - Score <12 if 1-7 years of school
  - Score <9 if no education

Mini-Cog: Three Item Recall and Clock Draw
- Ask the standard orientation questions
- Give three items to learn and repeat right away and then ask for recall after one minute
- Draw a clock showing the time now
- Validated in multiple languages
- Sensitivity is 76%
- Specificity is 89%

Simmons BB, et al. AAFP, 2011
Borson, JAGS, 2003
### DSM5 Neurocognitive Disorder

- **Clinical diagnostic criteria**
  - Memory impairment AND one or more:
    - Aphasia: language problems
    - Apraxia: motor problems
    - Agnosia: sensory problems
    - Disturbance in executive functioning
  - Deficits impair social/occupational function, represent a decline from baseline, not due to delirium, depression
  - Mild cognitive impairment: impairment does not affect function

### Mini-Mental State Exam

- **Maximum score 30**
- Score <24 suggests cognitive impairment
- Decline of 4 points over 1-4 yr significant
- Scores inversely correlated with age; median score = 25 if age >80
- Not as sensitive in people with higher levels of education; median score = 22 if 0-4 yr of education
- MMSE is proprietary

  - Crum RM et al. JAMA, 1993;269(18); Holsinger T, et al. JAMA, 2007;297.

### Montreal Cognitive Assessment

- Maximum score is 30 points
- >26 is normal
- May be better at diagnosing mild cognitive impairment
- Includes executive function testing
- Better for use with patients with limited formal education
- [www.mocatest.org](http://www.mocatest.org)
- Not proprietary

### Work-Up of Cognitive Impairment

- **American Academy of Neurology recommendations**:
  - Vitamin B12, thyroid, depression screen
  - Other tests as indicated: blood count, urine tests, liver tests, syphilis test, lumbar puncture
  - Neuro imaging (CT or MRI)
Symptomatic Treatment of Memory Disturbance

- Cholinesterase Inhibitors delay degradation of acetylcholine at the synaptic cleft
- Indicated for mild-moderate Alzheimer’s
- Donepezil (Aricept)–5-10mg/day
  - Rivastigmine (Exelon)–6-12mg/day
  - Galantamine (Razadyne)–24-32mg/day or patch 4.6-9.5mg
- May cause weight loss, nausea, vomiting, diarrhea, vivid dreams, AV Block, bradycardia

Clinical Significance of Long-term Donepezil Treatment

- 565 patients with mild-mod AD randomly assigned to donepezil 5mg or placebo for 12-week run-in; Followed up to 3 years
- End points: Institutionalization or progression of disability (loss of ADLs): No difference in rates by treatment
- No difference in care costs, unpaid caregiver time, behavioral/psychological symptoms


Example of 18F-FDG-PET

Evaluation of Driving Risk in Dementia – Practice Parameter

- Patient at increased risk for unsafe driving:
  - Caregiver rates patient’s driving ability as marginal or unsafe
  - Pt has previous accidents or citations
  - Pt has reduced driving mileage or self-reported situational avoidance
  - MMSE score < 24
  - Pt with aggressive/impulsive personality
  - Report to DMV

Iverson D.J. et al. Neurology, 2010;74
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Updates in Prevention
Estrogen Replacement Therapy

- Women’s Health Initiative Memory Study
  - 4532 healthy post-menopausal women (65-79)
  - Randomized to estrogen/progestin or placebo
  - Estrogen/progestin increased risk for probable dementia (HR 2.05)
- 2947 randomized to estrogen only or placebo
  - Increased risk of development of probable dementia (HR 1.49; CI 0.83-2.66)


Updates in AD Prevention
Should Statins be in the Water?

- RCT: Pravastatin vs. placebo
  - No difference in cognitive function after 3.2 years
- RCT: Simvastatin vs. placebo
  - No difference in incidence of dementia
- No evidence statins prevent vascular dementia

Heart Protection Study Collaborative Group. Lancet, 2002;360.

Prevention of AD with Anti-Inflammatory Drugs

- Meta-analysis of observational studies
  - NSAIDS >2yrs reduced risk by 73%
  - Confounding?
- RCT
  - 2528 volunteers >70 yrs with FH AD
    - Naproxen vs. Celebrex vs. Placebo
    - Study stopped after 3 years: no evidence anti-inflammatories prevent AD

BMJ, 2003(327); Neurology 2007(68)

Sleep and AD

- Sleep and AD = bidirectional relationship
  - Brain regions involved in sleep and circadian control affected early in AD
  - Patients with AD often have worse quality of sleep
  - Sleep changes may precede onset of cognitive symptoms
    - Amyloid deposition associated with worse sleep quality
- Chicken or the egg?
- Chronic disrupted sleep likely has some cognitive effect
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Leisure Activities and Risk of AD
- Multiple small trials: May improve short-term global cognitive function in pts with dementia/MCI
- Cognitive reserve is protective
- Cognitive Training may work
  - Neuro Racer

USPTE, Ann Intern Med, 2014

Exercise and Dementia Prevention
- Meta-analysis: 33,816 non-demented patients followed prospectively
- Participants with high-level physical activity protected against cognitive decline (HR=0.62; 95% CI 0.54-0.7)
- Low-moderate exercise was also protective (HR 0.65; CI 0.57-0.75)


Prevention of AD – Stay Positive

Risk and Prevention of Falls

Barnes DE and Yaffe K. Lancet Neurol, 2011
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Falls Burden in Older Adults
- 15,000 deaths, 475,000 hospitalizations, 1,360,000 ED Visits; Latinos have highest rate
- Serious Falls-related Injuries:
  - Hip fractures (55%): 20% mortality at 1 year
  - Non-Hip fractures (21%)
  - Traumatic Brain Hemorrhage (10%)
  - Chest Injury (7%)

Functional Consequences of Falls
- 60% report moderate activity restriction
- 33% require help with ADLs
- Increases risk of nursing home placement
- One-third develop fear of falling:
  - Decreases physical and social activity
  - Decreases self-reported health status
  - Increased depression

LR of Risk Factors for Future Falls
- Fall in last year: 2.8 - 3.8
- Orthostatic hypotension – 2
- Visual acuity 2
- Gait and Balance 1.7
- Medications
- Assess Cognition 4 - 17
- Limitation in ADLs or IDLs: 2 - 4

Gait and Falls
- Gait abnormalities in 20% to 40% of persons >65 and over 50% if ≥ 85 y
- Gait speed predicts 10-year mortality
- Assess normal, safe speed
- In office tests: Gait balance test
- Learn with physical therapy evaluation
- Risk of multiple falls among >64 y from California Health Interview Survey: Latinos 17%, Blacks 11%, Asians 8%, Whites 12%
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Falls Recommendations USPSTF

- Exercise and physical therapy significantly reduces falls; the more the better: RR = 0.85 (0.78-0.92)
- Vitamin D supplementation without calcium: RR = 0.83 (0.77-0.89)
- Vision correction shows no reduction
- Multifactorial intervention seems to reduce falls but not statistically significant

Osteoporosis

What is Osteoporosis?

- In adults, bone is constantly removed and replaced
- Osteoporosis is loss of mineral and structural integrity with resulting fragility
- Fractures common in older individuals

What About Trauma?

- Even non-osteoporotic bone will fracture with extreme trauma
- There is no threshold for skeletal fragility
- The weaker the bone the less trauma required to fracture...
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Traditional Risk Factors for Fracture

- Older age, Postmenopausal woman, and White/East Asian race
- Other important risk factors
  - Family history of fracture
  - Low body weight (<127 lbs. in women)
  - Smoker, >3 drinks/d
  - Certain drugs and diseases
  - Previous fracture (hip or spine)
- Measurement of bone mineral density (BMD) strongly predicts fracture

Bone Mineral Density (DXA)

Interpretation of DXA Scans: Really Confusing

- Mineral (calcium) content using x-rays
- Relative to young adult reference population
- T-score is the number of standard deviations above or below average 30 year old
  - T greater than −1.0 = “normal”
  - T between −1.0 and −2.5 = “low bone mass”
  - T less than −2.5 = “osteoporosis”
- Large studies show low BMD increases fractures risk in both women and men

BMD Tertile and Risk Factors

Cummings et al., NEJM 332(12):767-773, 1995
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Who Should Have a DXA?

- Guidelines for general population*
  - All women > 65 y or older
  - Postmenopausal with fracture, family history, smoker, weight <127 lbs, certain medications
  - Women <65 y with fracture risk equal to 65 y old White woman
- Usually covered by insurance
  (Medicare: pays $128)
- Not approved for men yet

Revised 2013 National Osteoporosis Foundation Guidelines

Hip BMD and Fracture Risk at Age 50

<table>
<thead>
<tr>
<th>T-score</th>
<th>Hip fracture risk</th>
<th>5 year</th>
<th>Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; -1</td>
<td>&lt;1%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>-1 to -2</td>
<td>1%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>-2 to -3</td>
<td>1%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>&lt; -3</td>
<td>2%</td>
<td>41%</td>
<td></td>
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</table>

Hip BMD and Fracture Risk at Age 70

<table>
<thead>
<tr>
<th>T-score</th>
<th>Hip fracture risk</th>
<th>5 year</th>
<th>Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; -1</td>
<td>1%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>-1 to -2</td>
<td>1%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>-2 to -3</td>
<td>4%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>&lt; -3</td>
<td>9%</td>
<td>29%</td>
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</table>

Calculating Absolute Fracture Risk: FRAX

http://www.shef.ac.uk/FRAX/tool.jsp
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What About Interval Screening?

- Recommendations of q 2 y as interval to measure change
- No evidence based guidelines
- 4597 women in Study of Osteoporosis Fractures: BMD baseline, 2, 6, 10, 16 y
- Estimated interval to transition from normal to low bone mass, to osteoporosis

Repeat Screening: Risk at Age 65 of Developing Osteoporosis Over Next 15 Years

<table>
<thead>
<tr>
<th>BMD Result Femoral Neck</th>
<th>15 Yr Risk for Osteoporosis</th>
<th>Time to 10% BMD &lt;-2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal &gt; -1.0</td>
<td>0.8%</td>
<td>16.8 y</td>
</tr>
<tr>
<td>T = -1.01 to -1.49</td>
<td>4.6%</td>
<td>17.3 y</td>
</tr>
<tr>
<td>T = -1.50 to -1.99</td>
<td>20.9%</td>
<td>4.7 y</td>
</tr>
<tr>
<td>T = -2.00 to -2.49</td>
<td>62.3%</td>
<td>1.1 y</td>
</tr>
</tbody>
</table>


Implications for Screening

- BMD results of more than –1.49 at age 65 can defer repeat screening to age 80
- BMD results of –1.50 to –1.99 at age 65 can merits repeat screening BMD at 5 years
- BMD results –2.00 to –2.49 may need rescreening at 2 years
- Caution: 49% original SOF sample had osteoporosis
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Under Recognition of Osteoporosis

- Among women with fracture or BMD T < −2.5 only 20-30% are evaluated and treated!
- 12 months after hip fracture at the VA: 2% had DXA, 15% treated with appropriate drug
- Implications for clinicians: Ask about fracture history, note vertebral fractures, use chart reminders for DXA

Medical Work-up: Opinion, Little Data
A reasonable start:
- Vitamin D (25-OH, not 1,25-OH)
- Serum calcium, kidney, TSH
- Additional tests to consider:
  - Sprue serology, SPEP, UEP
- Unlikely to help: PTH, urine calcium

Osteoporosis Risk Factors and Evaluation
- Osteoporosis is silent until something bad happens: Under recognized
- Routine assessment of risk factors and screening DXA. Extensive lab testing wasteful.
- Everyone should receive lifestyle and nutritional counseling
- Calculation of absolute risk (FRAX) at www.NOF.org helps clinicians/patients

Who Should Be Treated*?
- Preventive measures for everyone: adequate calcium and vitamin D in diet, exercise, no tobacco, limit alcohol
- When to offer pharmacologic therapy:
  - Anyone with hip or vertebral fracture
  - T-score ≤ −2.5 in femoral neck, hip, spine
  - “Low bone mass” and 10-year fracture risk ≥ 20% or hip fracture risk ≥ 3% by FRAX

Soloman, Mayo Clin Proc, 2005
Shibli-Rahhal, Osteo Internat, 2011
Jamal et al, Osteo Inter, 2005
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What Can Be Done To Prevent Osteoporosis?

Non-pharmacologic Interventions

- Smoking cessation, avoid excess alcohol intake
- Physical activity: modest transient effect on BMD – reduces fracture risk
- Conflicting data on hip protector pads (adherence is big problem)
- Calcium and vitamin D

Calcium and Vitamin D

- Chapuy, 1992
  - Elderly women in long-term care
  - 30% decrease in hip fracture
- Porthouse, 2005:
  - Independent women >70 with 1+ risk factor
  - No benefit on hip or other fractures
- Pooled studies: 12% fewer fractures together, little benefit alone

How Much Is Enough for Skeletal Health?

The Institute of Medicine

- Calcium
  - 1200 mg/d for women >50, men >70
- Vitamin D
  - Recommends daily intake 600-800 IU/d, no more than 4,000/d
  - Recommends serum levels 20-50 ng/ml
  - Non-skeletal benefits not established, harms minimized

Chapuy, NEJM, 1992

IOM Report, 2010
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US Preventive Task Force Recommendations

- Insufficient evidence to assess risks/benefits for daily supplementation with calcium >1000 mg/d and vitamin D3 400 IU
- Recommends against daily supplements of Vitamin D 400 IU or less and calcium 1000 mg or less to prevent fractures
- Vitamin D supplements effective in preventing fractures in ≥65 y at risk of falls

Moyer VA, USPTF, Ann Intern Med 2013; 691-6

Bisphosphonates

- Bind to bone and prevent absorption and remodeling
  - Resides in bone for decades
- Four approved agents: alendronate, risedronate, ibandronate, and zoledronic acid
- What we know: fracture risk reduced 30-50% if
  - Existing vertebral fracture OR
  - Low BMD (T-score < -2.5)
- May not be as useful if higher BMD (“low bone mass”)

Effect of Alendronate on Non-spine Fracture Depends on Baseline BMD

<table>
<thead>
<tr>
<th>Baseline hip BMD</th>
<th>Relative Hazard (± 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T -1.5 – -2.0</td>
<td>1.06 (0.77, 1.46)</td>
</tr>
<tr>
<td>T -2.0 – -2.5</td>
<td>0.97 (0.72, 1.29)</td>
</tr>
<tr>
<td>T &lt; -2.5</td>
<td>0.69 (0.53, 0.88)</td>
</tr>
<tr>
<td>Overall</td>
<td>0.86 (0.73, 1.01)</td>
</tr>
</tbody>
</table>

Cummings, Jama, 1998

Risedronate HIP Study: Two Groups

Group 1
- 5445 age <80; hip BMD T-score < -3.0
- 39% decreased hip fracture risk

Group 2
- 3886 age >80; risk factors for hip fx
- No significant effect on hip fracture risk

McClung, NEJM, 2001
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Adherence with Bisphosphonates is Poor
- Burdensome oral administration (fasting, remain upright for 30 minutes)
- Upset stomach and heartburn can occur
- 50-60% persistence after one year with daily dosing
  - Similar to other preventative tx
  - Multiple practice settings
- Likely better with weekly, monthly and yearly (intravenous) administration

Bisphosphonates Once-a-week
- Identical effects on BMD
- Possibly fewer effects on esophagus
- No fracture trials
- Daily to weekly may improve compliance; Weekly to monthly may not

Does Dosing Interval Matter?
- Yearly dosing now available:
  - Zolendronate
    - Very potent bisphosphonate
    - 3 yr, multicenter controlled trial
    - 7741 women 55-89, T-score <-2.5 or <-1 + vertebral fracture
    - Zolendronate 5mg IV once/yr vs. placebo

But Be Skeptical of Wonder Drugs…

Schnitzer, Aging, 2

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Black et al, NEJM, 2007
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Urinary Dysfunction
Incontinence
Overactive Bladder

Prevalence of urinary incontinence in women across the age spectrum

The EPINCONT Study (N=27,000)


Changes in Lower Urinary Tract Function with Aging

↑ involuntary bladder muscle contractions
↓ total capacity of the bladder
↓ bladder contractility and urinary flow
↑ atrophy of urethral mucosal epithelium

Pathophysiology of incontinence

Urge incontinence
(leakage from a sudden or strong urge to urinate)

Stress incontinence
(leakage associated with abdominal pressure)

Overflow incontinence
(frequent or constant small-volume urine leakage)

Functional incontinence
(inability to get to the toilet or recognize the need to void)
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Distribution of stress, urge, and mixed UI in women across the age spectrum

Vaginal and C-section delivery both increase risk of incontinence

Adjusted odds ratios for UI by mode of delivery*

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Any UI</th>
<th>Moderate or severe UI</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-section vs no delivery</td>
<td>1.7 (1.3-2.1)</td>
<td>1.6 (1.1-2.3)</td>
</tr>
<tr>
<td>Vaginal delivery vs no delivery</td>
<td>2.8 (2.5-3.2)</td>
<td>3.3 (2.7-4.0)</td>
</tr>
<tr>
<td>Vaginal delivery vs C-section</td>
<td>1.7 (1.2-2.1)</td>
<td>2.2 (1.5-3.1)</td>
</tr>
</tbody>
</table>

*Adjusted for age, parity, years since last delivery, & BMI


Dose-response between body mass index and incontinence risk

The impact of diabetes on urinary incontinence risk in women

- Diabetic women with 28% ↑ risk of any UI and 40% ↑ risk of severe UI in Nurses Health Study
- Risk of incident UI increased with increasing duration of diabetes
- Adjustment for age, parity, BMI, and medication use did not explain increased risk
- Possible mechanisms— damage to innervation of bladder & urethra, ↑ volume of urine

Adapted from Hannestad et al. J Clin Epidemiol, 2000

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Behavioral treatment for Urgency Incontinence

- Pelvic floor muscle exercises
- Bladder training techniques
- Urge suppression techniques

Bladder training techniques

- Instruct patients to start voiding every hour regardless of need to urinate
- Progressively increase the interval by 30 minute increments to reach 3-4 hours
- Recommend pelvic muscle contractions for urgency between voiding

Urge suppression techniques

When you feel the urge to urinate...
- Stop, sit down, and take deep breaths
- Imagine the urge peaking, then subsiding
- Practice pelvic floor muscle exercises

Once you feel the urge is under control
- Walk slowly to the bathroom and void

Pelvic floor muscle exercises

- Teach patients to distinguish between pelvic vs abdominal or buttock muscles
- Recommend repetitions on a set schedule (e.g., set of 10, 5 times/day)
- Encourage patients to work up to holding contractions for 3+ seconds at a time
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The traditional extended evaluation for incontinence in women

- Clinical history
- Urinalysis test
- Voiding diary
- Neurologic exam
- Pelvic exam
- Post void residual
- Cough stress test

The 3 Incontinence Questions (3IQ)

1. During the last 3 months, have you leaked urine, even a small amount? a. Yes; No → no further questions.
2. During the last 3 months, have you leaked urine:
   a. When you were performing some physical activity such as coughing, sneezing, lifting or exercise? b. When you had the urge or the feeling that you needed to empty your bladder but you could not get to the toilet fast enough? c. Without any physical activity or a sense of urgency
3. During the last 3 months, have you leaked urine most often:
   a. When you were performing some physical activity such as coughing, sneezing, lifting, or exercise? b. When you had the urge or the feeling that you needed to empty your bladder but you could not get to the toilet fast enough? c. Without any physical activity or without a sense of urgency? d. About equally as often with a physical activity and with urgency?

Diagnostic Aspects of Incontinence Study (DAISy)

- Multi-center study of ambulatory women with weekly incontinence (N=301)
- Exclusions: self-reported stroke or major neurologic condition, prolapse, urologic surgery
- Compared diagnosis by 3IQ + urinalysis versus traditional extended evaluation
- 3IQ had sensitivity & specificity of 0.75 and 0.77 for urge UI, 0.86 and 0.60 for stress UI

BRIDGES clinical trial

- Goal: evaluate efficacy and safety of pharmacologic therapy for urgency UI in women diagnosed by 3IQ
- 645 ambulatory women identified by the 3IQ randomized to pharmacologic therapy vs placebo
- Moderate decrease in incontinence frequency over 12 weeks (average reduction of 1 episode per day)
- No serious adverse events associated with pharmacologic therapy in this setting

# NEW DEVELOPMENTS IN HYPERTENSION

<table>
<thead>
<tr>
<th>Name</th>
<th>Available forms</th>
<th>Instructions for use</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immediate-release</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxybutynin (Ditropan)</td>
<td>2.5 or 5 mg</td>
<td>Start at 2.5 mg (1/2 pill) BID ADJUST to maximum of 5 mg QID</td>
<td>3</td>
</tr>
<tr>
<td>Tolterodine (Detrol)</td>
<td>1 or 2 mg</td>
<td>Start at 2 mg BID, lower to 1 mg BID if poorly tolerated</td>
<td>$$$</td>
</tr>
<tr>
<td>Trospium (Santura)</td>
<td>20 mg</td>
<td>Take 20 mg BID, lower to 20 mg QHS if poorly tolerated</td>
<td>$$$</td>
</tr>
<tr>
<td><strong>Extended-release</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxybutynin ER (Ditropan XL)</td>
<td>5, 10, or 15 mg</td>
<td>Start at 5 or 10 mg QD, increase to max of 30 mg QD</td>
<td>3</td>
</tr>
<tr>
<td>Tolterodine LA (Detrol LA)</td>
<td>2 or 4 mg</td>
<td>Start at 4 mg QD, lower to 2 mg QD if poorly tolerated</td>
<td>$$$</td>
</tr>
<tr>
<td>Darifenacin (Enablex)</td>
<td>7.5 or 15 mg</td>
<td>Start at 7.5 mg QD, wait ≥ 2 weeks before increasing dose to 15 mg</td>
<td>$$$</td>
</tr>
<tr>
<td>Trospium XL (Santura)</td>
<td>60 mg</td>
<td>Take 60 mg QD</td>
<td>$$$</td>
</tr>
<tr>
<td>Solifenacin (Vesicare)</td>
<td>5 or 10 mg</td>
<td>Start at 5 mg QD, increase to max of 10 mg QD as tolerated</td>
<td>$$$</td>
</tr>
<tr>
<td>Fesoterodine (Toviaz)</td>
<td>4 or 8 mg</td>
<td>Start at 4 mg QD, increase to max of 8 mg as tolerated</td>
<td>$$$</td>
</tr>
</tbody>
</table>

**Tips on starting an anti-muscarinic medication for urge incontinence**

- Avoid in patients with gastric retention, severely-decreased GI motility
- Contraindicated in narrow-angle glaucoma (consider possibility in elderly, farsighted, Asian)
- Start with a low dose (e.g., ½ pill of oxybutynin 5 mg twice daily), then increase as tolerated
- Discuss strategies for preventing or decreasing side effects (e.g., lozenges)

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**Male Stress Incontinence Treatments**

- Mild (materials) Injectable Therapy
- Mild - Moderate Male Slings
- Severe artificial Sphincter

**Overactive Bladder Definition**

- Urinary urgency
- With or without urge incontinence
- Usually with frequency & nocturia
- OAB affects 16% of population
- 33 million adults
- Prevalence: women = men
NEW DEVELOPMENTS IN HYPERTENSION

Behavior Modification
- Lifestyle modification
  - limit fluid (4-6 glasses)
  - avoid caffeine, alcohol
  - dosing of diuretic
  - elevate legs
  - compression stockings
  - afternoon nap

Nocturia

Behavior Modification
- Timed voiding
  - assisted toileting
- Bladder retraining
  - Kegel exercises (can suppress urge)
  - restore cortical control
  - support & encouragement important
  - more effective in frequency or urgency of non-neurologic origin

Surgical Therapies
- Nerve Stimulation
  - Posterior tibial nerve (SANS, TENS)
  - Sacral nerve (InterStim®)
- Botulinum toxin injection into the bladder – FDA approved!
- Bladder augmentation

Botulinum A
- Easy outpatient procedure
- Efficacy 50-70% (some nearly 100% improvement)
- Lasts 6 months
- Main side effect: retention, UTI
- No serious complications
- FDA approved
Summary of OAB

- OAB is THIRD most common chronic condition in the United States!
- Lifestyle modifications and medications best first step
- Temporary and permanent surgical therapies are available as well