

# Geriatric Incontinence and Voiding Dysfunction

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# Agenda

- Review
- Why is Geriatric UI/VD different?
  - Pathophysiology
  - Co-morbidities
  - Treatment
- What's new?

# Who are We Talking About?

- Older definition: >65
  - Based on older assessments
  - Not reflective of our current “older population”
- Trend now (at least for research) is >75
  - More reflective of our older population
  - More likely to include “frail elderly”

# What is different about UI & Voiding Dysfunction in the Geriatric Patient?

- Age related changes: occur in everyone
- Age associated changes: accumulation of pathologic conditions that do not occur in everyone
- Does it matter??
  
- LUTs
- Nocturia
- BOO
- Incontinence

# Definitions

- Frequency: the need to void very often, typically affecting QOL. (>8x / day)
- Nocturia: need to void during night, typically affecting QOL (>2x)
- Urgency: Sensation to void that is so strong that fear of urine loss is imminent
- Incontinence: involuntary loss of urine

# Types of Incontinence

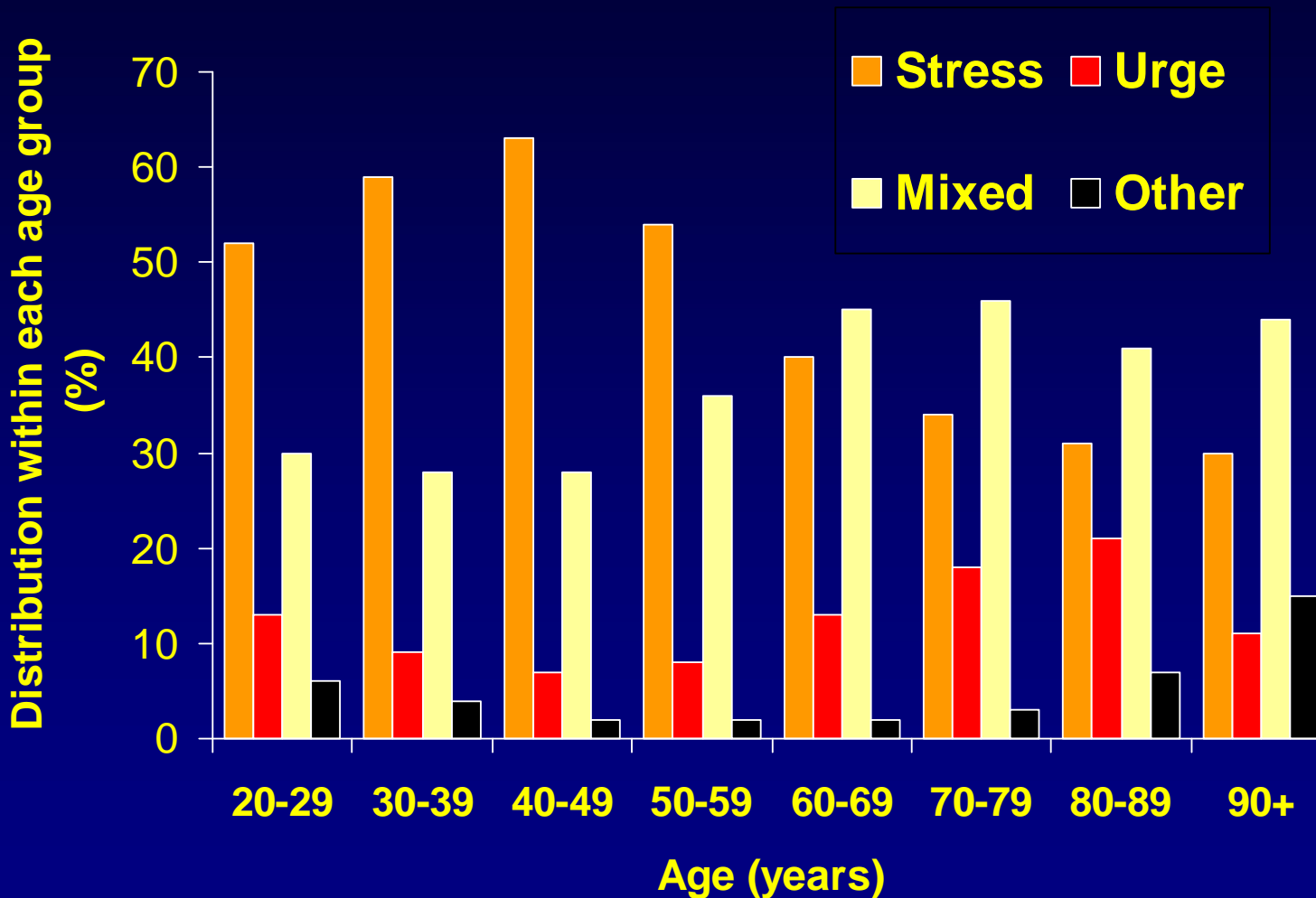
- Stress UI (SUI)
  - Incompetent bladder outlet
  - Leakage associated with activity & putting pressure on bladder
- Urge UI (UUI)
  - Component of OAB
  - Due to involuntary detrusor activity
- Mixed UI (MUI)
  - Usually combination of SUI and UUI
- Overflow--retention
- Functional
  - implies normal GU tract
  - environmental issues prohibit timely void

# Urinary Incontinence

## General Info

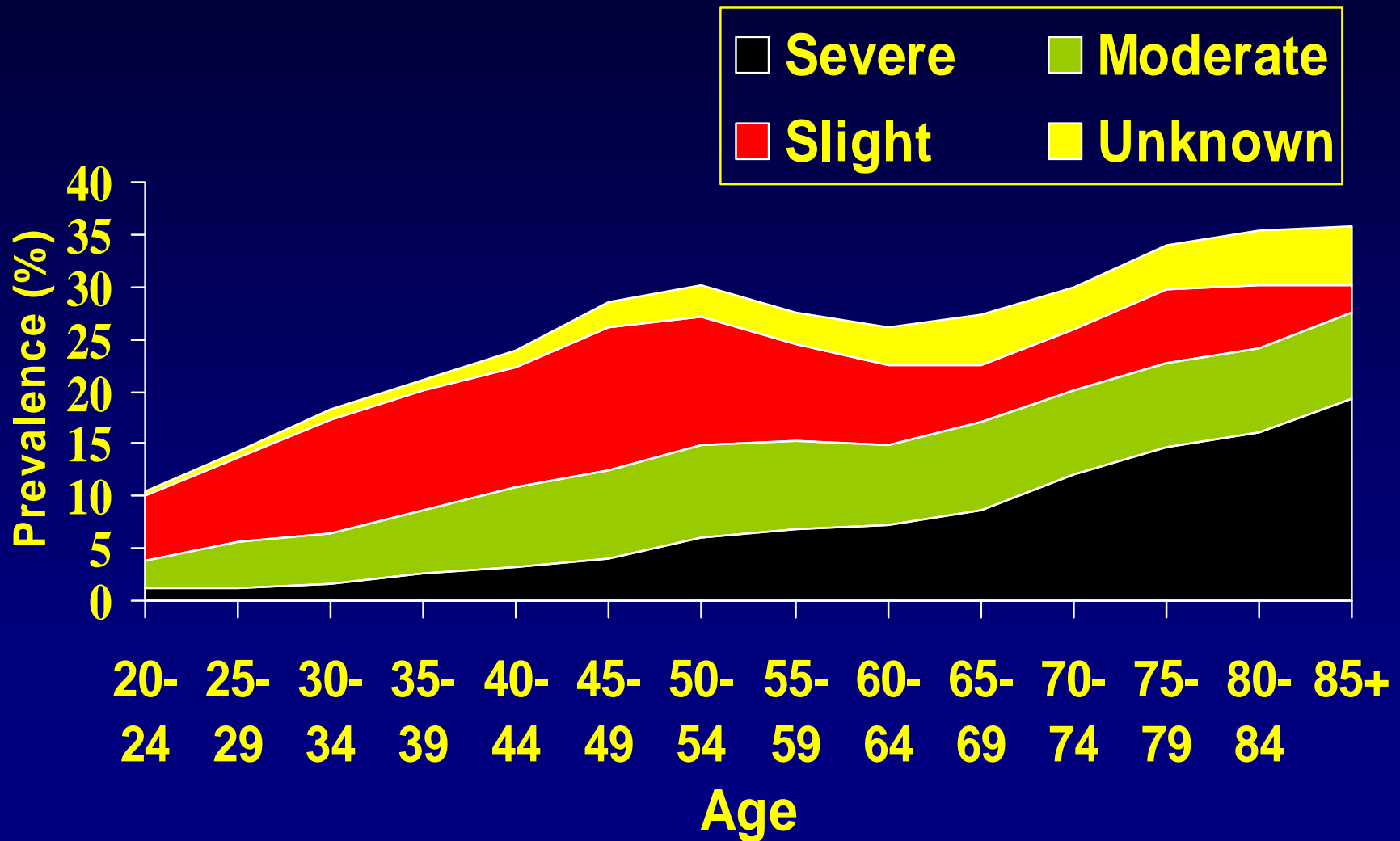
- 13-25 million Americans
- 10-35% of all adults
  - 30%-50% of those ages > 60 years
  - 50% women experience UI at some point
  - 33% women experience regular UI
- Female > Male (70% vs. 30%)
  - <60 yo: 4:1
  - >60 yo: 2:1
- >50% Nursing home residents
  - often precipitating factor for placement
  - there are 1.5 million Americans in NH

# Distribution of UI by Different Subtypes & by Age Group





# Prevalence of Incontinence by Age and Severity



# Geriatric Voiding Dysfunction

- Voiding dysfunction directly attributed to factors of aging
  - Effects at bladder level
  - Effects at CNS level
- “Routine” Voiding problems exacerbated by age factors
  - Greater prevalence with elderly
  - GU condition worsened by other factors
- Limitations in treatment due to age factors

# Age-related LUT Changes

- Bladder
- Urethra
- Pelvic floor
- Vagina
- Prostate

# Age-related LUT Changes: Bladder

- Increased incidence detrusor overactivity
- Decline in detrusor contractility
- Decrease in detrusor capacity
- Decrease in flow rate

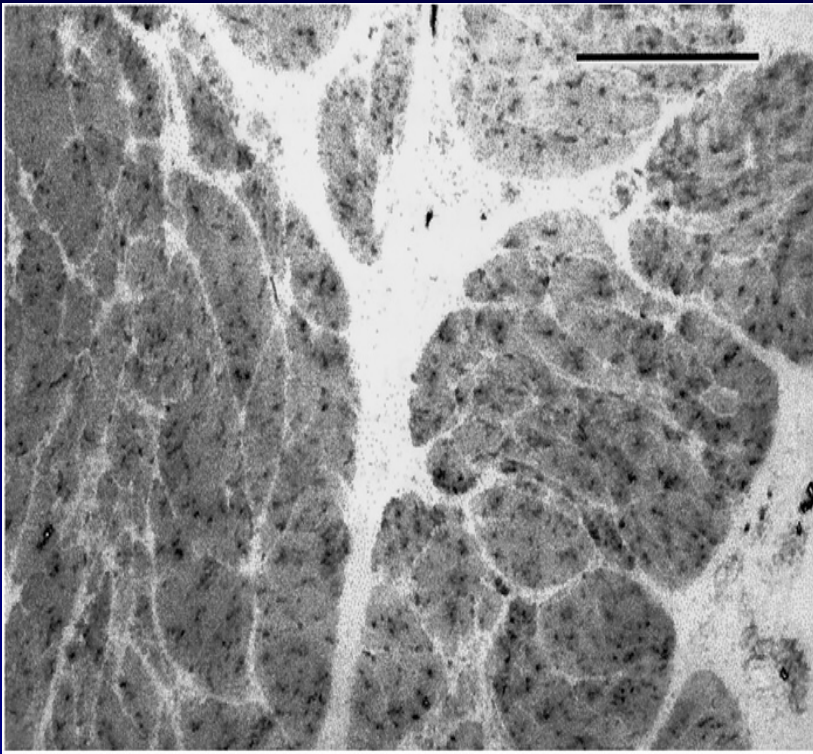
DuBeau, International Consultation on Incontinence 2008  
*Valentini et al, SUFU 2008, Pfisterer 2006, Taylor & Kuchel 2007*

# Myogenic DO: Etiology

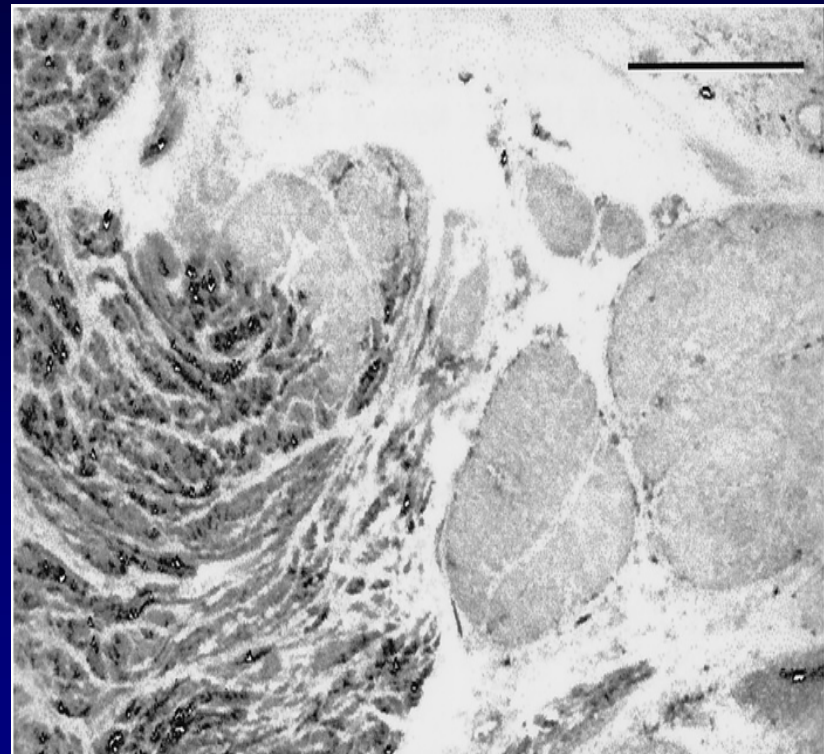
- Detrusor changes: ultrastructural level
  - Altered smooth cell properties
    - Altered signal transduction
    - Altered cell to cell gap junctions
    - Reduced contractile force
    - Does not need neural stimulation
      - spontaneous detrusor activity
      - Extra foci of activity
      - Disorder of synchronization?
  - Denervation injury/super-sensitivity
    - Changes in nerve receptor densities
    - Allows for ectopic foci
    - Less efficient transmission
  - Increased collagen content

Elbadawi 1997  
Mills 2000

# Voiding Disorder: Bladder Level Cholinergic Denervation



Normal Bladder-Cholinergic  
Nerve Distribution



Idiopathic DH-Patchy  
cholinergic denervation

Mills 2000

# Age-related LUT Changes: Urethra

- Decreased vascular density & blood flow
- Decreased striated & circular smooth muscle density
- Decreased urethral sensation

DuBeau, International Consultation on Incontinence 2008  
Yang 2006, Siracusano 2006, Liang 2006, Clobes 2008,  
Trowbridge 2007, Kenton 2007

# Age-related LUT Changes: Pelvic Floor

- Recent studies saw no age related changes in pelvic floor and vaginal tissue
- However, lifetime risk of POP surgery is 11.1% for women over 80 (reported in 1997)
- Need for POP surgery likely to increase
  - POP and SUI more accepted by society
  - Aging population with baby boomers “coming of age”
    - 1994: 1%
    - 2020: 2%
    - 2040: 4%

DuBeau, ICI 2008; Lawrence 2008, Trowbridge 2007,  
Talas 2008, Tan 2006

Olsen AL et al . Obstet Gynecol 1997

Arisco & Kraus, Current Opinion in Urology 2008



# Age: Prolapse

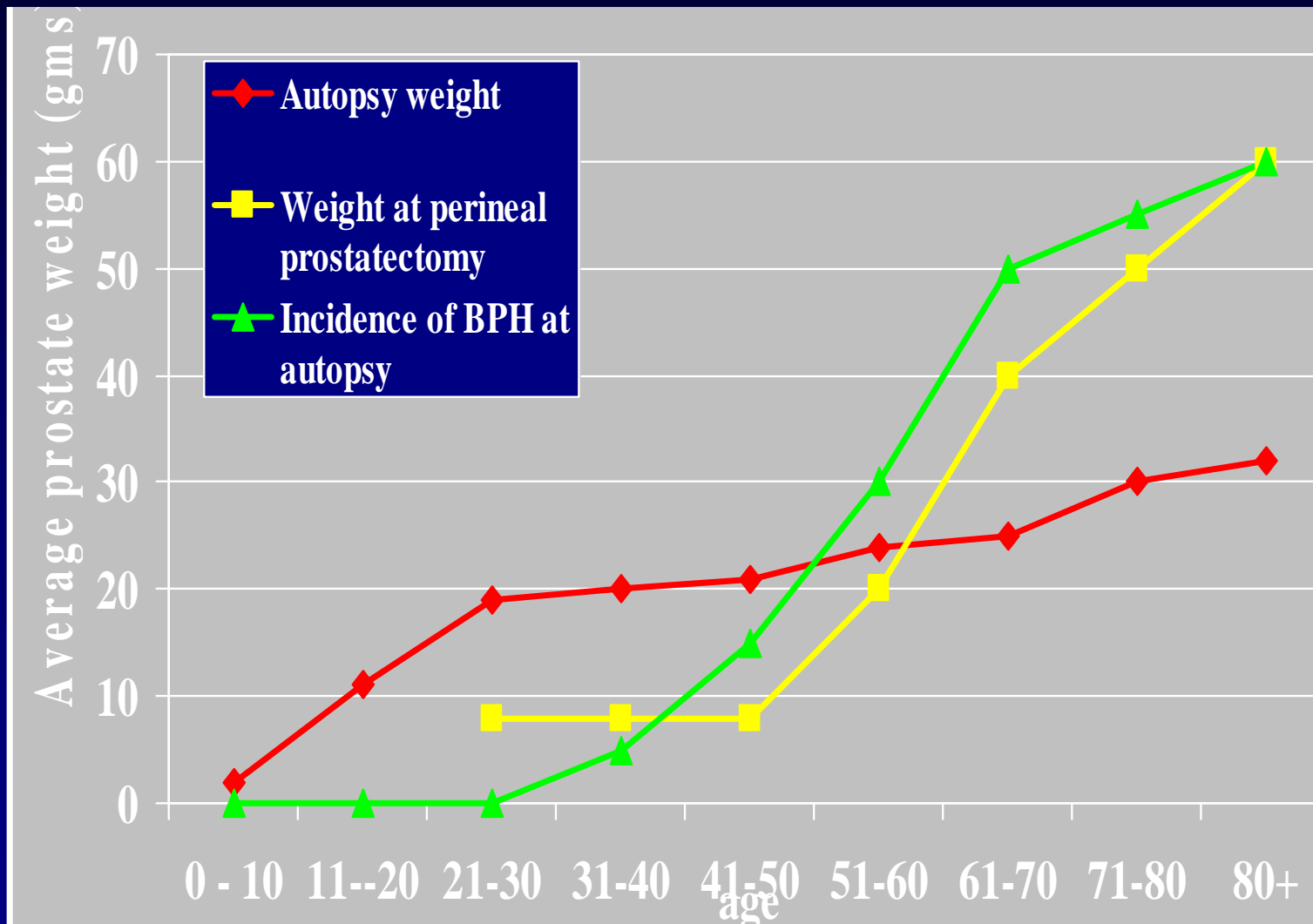
<i>Age (y)</i>	<i>Stage 0</i>	<i>Stage 1</i>	<i>Stage 2</i>	<i>Stage 3</i>
18-29 (n = 66)	22.7%	50.0%	27.3%	—
30-39 (n = 116)	6.9%	50.9%	41.4%	0.9%
40-49 (n = 154)	2.6%	44.2%	51.9%	1.3%
50-59 (n = 95)	3.2%	38.9%	55.8%	2.1%
60-69 (n = 47)	4.3%	27.7%	59.6%	8.5%
≥70 (n = 19)	—	26.3%	52.6%	21.1%

- Direct correlation: advanced age & degree of prolapse
- Decrease in urethral pressures and length
- Risk factors
  - Multiple parturitions
  - Hormonal-menopausal effects
  - Pelvic Surgery
  - Systemic disease effects

# Age-related LUT Changes: Prostate

- BPH progresses from microscopic state to a macroscopic state to a clinical disease state
- Microscopic BPH
  - Begins as early as 20-30 yo.
  - 80-100% all men will have microscopic evidence of BPH
- 50% of microscopic BPH develops into macroscopic nodules (~ 5 yrs)
  - 50% of these produce clinical disease,
- Thus 25% of microscopic BPH develops clinical disease

# Age-related changes in prostate weight



Berry et al, JU 1984

# Odds of Moderate/Severe Sxs Increase with Prostate Size

- Community based study
- Odds for moderate or severe LUTS (age adjusted)
  - 1.2 x greater for prostates  $> 30$  gm vs  $\leq 30$  gm
  - 3.0 x greater for prostates  $> 40$  gm vs  $\leq 40$  gm
  - 3.5 x greater for prostates  $> 50$  gm vs  $\leq 50$  gm

# Above the bladder

- CNS changes
- Cognitive dysfunction

# Micturition Neuro Reflex Arcs

- Sensory
- Sacral Center
- Reflex motor
  - Bladder
  - Sphincter
- Pons
- Cerebral

# Neural Control of Micturition: Storage

- Continuous central inhibition of micturition reflex
- Sphincter activity
- Accommodation of filling
  - local and central facilitation of increasing volume without pressure change

# Neural Control of Micturition: Voiding

- Volitional suppression of central inhibitory signal
- relaxation of sphincter
- Parasympathetic stimulation of detrusor contraction

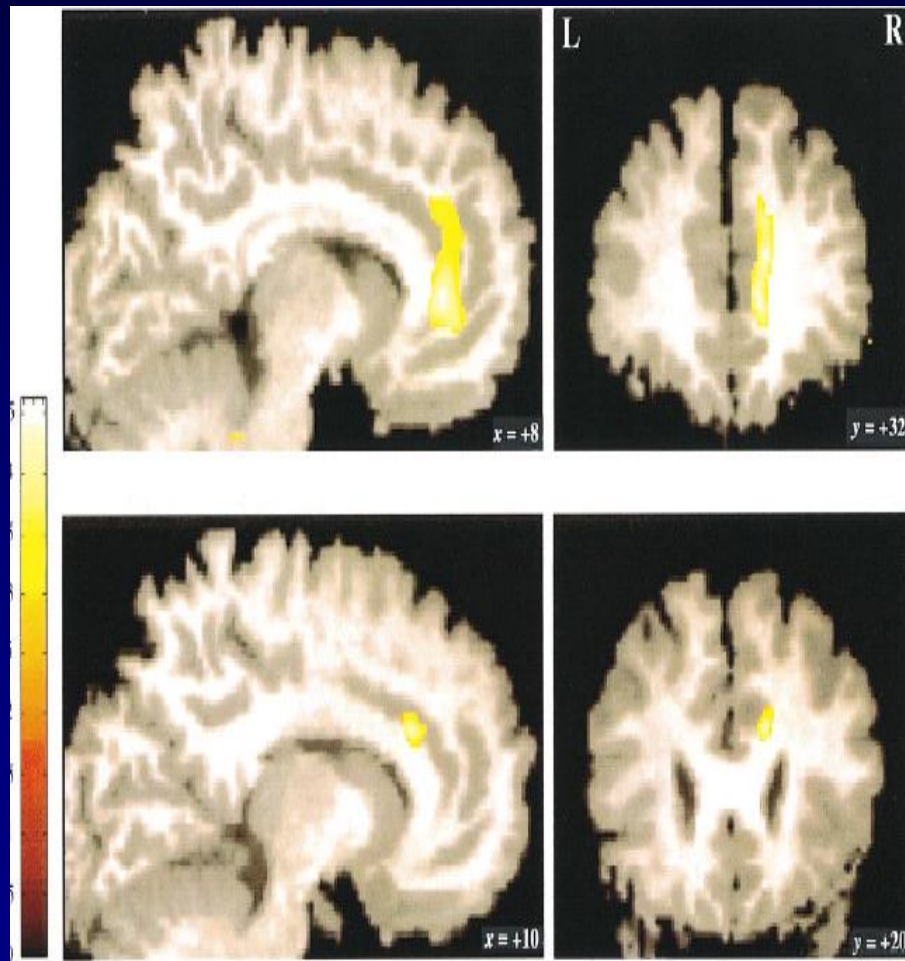


# Detrusor Overactivity (urge incontinence)

- Loss of **CENTRAL** inhibition
  - Failure to detect sensation
  - Failure to react to sensation
- Enhanced excitatory reflex neurotransmission
- Increased Primary Afferent Input from bladder
- New or unmasked bladder neuro-reflexes that are resistant to central inhibition
- Consequence of Aging?

# Above the bladder: CNS Changes

Normal Areas



- Blok et al (*Brain* 1997)  
R. Ant Cingulate Gyrus
  - Increased during void
  - Decreased during storage
  - Implies area for “control”
- Griffiths (*Behav Brain Res* 1998)  
Decreased perfusion frontal  
(esp. Right)
  - Genuine urge incontinence with reduced sensation

Blok et al, *Brain* 1997

Griffiths et al *Behav Brain Res* 1998

# Above the bladder: Cognitive dysfunction

- Obvious dementia
- Not so obvious cognitive decline
  - Loss of executive control may be related to UI
    - Executive control dysfunction-may be an early state of decline (not clinically obvious)
    - probably more common than thought
    - UI predictor of future cognitive decline (Miles 2001)
  - Is LUT dysfunction a predictor of Cognitive decline?
    - Weak association between irritative AUASI and Executive impairment

# Reversible (Transient) Incontinence

- **D**elirium
- **I**nfection
- **A**trophic Vaginitis
- **P**harmacological/Psychological
- **E**xcessive Urine output
- **R**estricted mobility
- **S**tool impaction

# UI and Cognitive Decline: Guilty by Association

- Patients with dementia often have UI
- Potential damage to cortical areas in charge of control
  - Loss of inhibition of involuntary detrusor contractions
  - Loss of sensory ability
  - Urge UI is most common form of UI in dementia
- Not always “reversible” but
  - Address possible causes of dementia exacerbation
  - Mobility often key factor
- Don't forget “routine” UI

# Transient Incontinence

- Infection
  - Reversible
  - Causes DH or impaired emptying
- Asymptomatic Bacteriuria
  - 10-20% community elderly
  - 30-40% institutional elderly
  - Risk increases as functionality decreases
  - Risk increased with menopause
    - Lower vaginal pH results in recolonization with uropathogenic
  - **HOWEVER: Treatment not shown to improve outcome**
    - Several prospective RCT in LTC Facilities: Abx vs. Placebo
    - No significant difference in symptomatic episodes
    - Infectious Disease Society **DOES NOT RECOMMEND** routine treatment of asymptomatic bacteriuria in the elderly

Colgan et al, AAFP, 2006

Robichaud et al Medscape 2009

# Transient Incontinence: Pharmacologic

- Sedative/hypnotics
  - Sedation
  - Immobility
  - Delirium/confusion
- Anticholinergics
  - Must also include: Antidepressants, Anti-psychotic, anti-Parkinson's
    - Retention/overflow incontinence
    - Anticholinergic actions (sedation, confusion, constipation, etc)
- Narcotic analgesics
  - Retention
  - fecal impaction
  - sedation/delirium

# Transient Incontinence: Pharmacologic

- Alpha Antagonists
  - Urethral relaxation leading to stress incontinence
- Alpha agonists
  - Male retention
- Calcium Channel blockers
  - Retention (bladder effect?)
  - Fluid redistribution leading to polyuria, frequency & nocturia
- Diuretics
  - Fluid redistribution leading to polyuria, frequency & nocturia



# Treatment of the Older patient with UI

- Is treatment the same as younger patient?
- Is the treatment as effective in the older patient?
- Is there a higher risk of side effects, complications, or other concerns?
- Are additional testing needed for the older patient?

# Review of Treatment Options

- Behavioral Therapy
- Pelvic floor exercises
- Medications
- Combination therapy
- Surgery

# Review of Treatment Options

- Behavioral Therapy (SUI, UUI, MUI)
  - Adjusting fluid intake
  - Timing of fluid intake
  - Urge strategies
  - Avoidance of bladder irritants (ex: caffeine)
- Pelvic floor exercises (SUI, UUI, MUI)
  - Often combined with behavioral therapy
  - Biofeedback
    - Thought to enhance capability to learn and do exercises

# Review of Treatment Options

- Medications (OAB: UUI, MUI)
  - OAB: Anticholinergics
  - SUI:
    - No available agents proven to be effective
    - Exception: Duloxetine but not approved for SUI
- Combination therapy
  - Behavioral and Anticholinergics

# Review of Treatment Options

- Surgery for SUI
  - Urethral bulking injections
  - Mid urethral slings (TVT, TOT)
- Surgery for UUI
  - Sacral nerve modulation therapy (Interstim)
  - Intravesical injection of Botulinum toxin (Botox)

# Behavioral therapy: Is it effective in Older Women with UUI

	Accidents/ week % reduction	Improvement with cross over
<b>Behavioral</b>	81 %	57% → 89%
<b>Drug</b>	69%	72% → 84%
<b>Control</b>	38%	

# Behavioral therapy & Older Women: Risks and Downside?

- No obvious concerns directly related to therapy itself
- Requires motivated patient
- Time commitment
- Cost

# Anticholinergics & Older patient with OAB/UUI: Effective?

- No difference in reduction of UUI episodes after Tolterodine therapy in patients <65 and >65
  - Reduction of UUI 12 vs. 11.5 (respectively)
- No difference between 65-74 vs. >75
  - Reduction of UUI 11.3 vs. 9.5 (p=NS)
- Same improvement in micturition frequency in patients <65 and >65
  - Reduced 24 hr frequency by 2.0 vs. 1.5 (respectively)



# Anticholinergics & Older patient Tolerable?

- No difference in dry mouth or constipation between patients <65 and >65
  - 23% vs. 24% reported dry mouth (vs. 8% for placebo)
  - 6% vs. 6% reported constipation (vs. 4% for placebo)
- No difference in discontinuation rates between patients <65 and >65
  - 5.5% vs. 5.1%
  - No differences in CNS categories: somnolence, headache, dizziness or vision changes
- Limited reliability: self reported, FDA trial, industry sponsored

# SUI Surgery and Older Patient

- UITN SISTER Trial: <65 yo vs. >65 yo
  - N=574 (<65) and N=81 (>65)
  - Mean ages: 49 vs. 70
  - Older women greater risk for persistent SUI @ 24 months (OR: 3.7)
  - Older women more likely to require repeat SUI surgery (OR: 3.9)
  - No difference in adverse events, length of hospital stay
- Medicare Analysis on sample of women undergoing sling between 1999 & 2000 (stratified by age <75 vs. >75)
  - Older women more likely
    - Higher incidence of postoperative urge incontinence (20% vs. 13%)
    - Treatment failure (11% vs. 7%)
    - Outlet obstruction (11% vs. 7%)
  - Older age and co-morbidities were associated with higher rates of nonurological complications.

Richter et al, Obstet & Gyn 2008

Anger et al JAGS 2007

# UUI Surgery and Older Patient

## ■ Problems:

- Limited to Refractory OAB, harder group to treat
- No comparative studies with younger population
- Paucity of data, retrospective

## ■ Sacral Nerve Modulation therapy

- N=25, mean age 69, 12/25 proceeded to implant
- Results:
  - 17% dry (less than expected)
  - ALL were Improved (better than 50%)
  - Well tolerated

## ■ Botulinum toxin intravesical injection tx

- N=10 (mean 75.3, all >65, 100-300 units)
- 5/10 reported >50% improvement, mean duration 4 mos
- 90% impaired emptying (pvr >150)

Amundsen et al AJOG. 2002;187:1462

Matteucci et al SUFU 2008

# SNM: Considerations for Elderly

- Advantages:
  - Minimally invasive
  - Avoid chronic antimuscarinic
  - Potential benefit for fecal incontinence and bowel disorders (research is promising)
- Disadvantages
  - Requires a procedure
  - Based on sole study (small), less likely to achieve dryness
- Patient selection is key

# Treatment Considerations

- Cure vs. improvement?
- QOL improvement can occur even in absence of cure
- From patient perspective, treatment should not be worse than the problem
- Usually begin least invasive and work up
  - But is that always right?
- Address reversible causes when possible

# Modifiable Conditions in the Geriatric Patient

- Medical Co-morbidities
  - Diuretics: adjust type, dose or timing
  - Diabetes Mellitus: stabilize
- Constipation: fiber, fluids, regular toileting
- Atrophic vaginitis: estrogen cream, ring
- Non-surgical options
  - Pessary
  - Urethral inserts

# Behavioral Treatment: Tips for the Geriatric Patient

- Accommodate any perceptual problems:
  - vision
  - hearing
- Adjust exercise progression for muscle weakness
  - Start low
  - Go slow
- Memory aids for memory problems
  - Audio tapes
  - Visual cues
  - Patient Hand-outs

# Voiding Aids

- Timers for prompted voiding programs
- Bedside Commode
- Seat elevator
- Handle bars
- Urinal (female too)
- Clothing
  - Velcro
  - Stretch waist
  - Avoid buttons





# Future: Research

- Needs to include more representative older population
  - >65 typically used
  - Probably need to consider older patients
    - >75 yo old
    - Include the “frail” or “vulnerable”
- Need more prospective comparative RCTs
  - Behavioral, drug, procedures
- Need to look at cognitive function