Urinary Incontinence in Older Women

Ted M. Roth, MD

The Bladder Control Center

The Central Maine Medical Family

Disclosures

- I was provided a grant from Medtronic to attend this program. I have no other relevant financial disclosures to make.
- Speaker for Astellas, Pfizer, Allergan.
- Proctor for Ethicon, Medtronic.
- This presentation will be fair balanced and non-commercial.

Definition of Urinary Incontinence

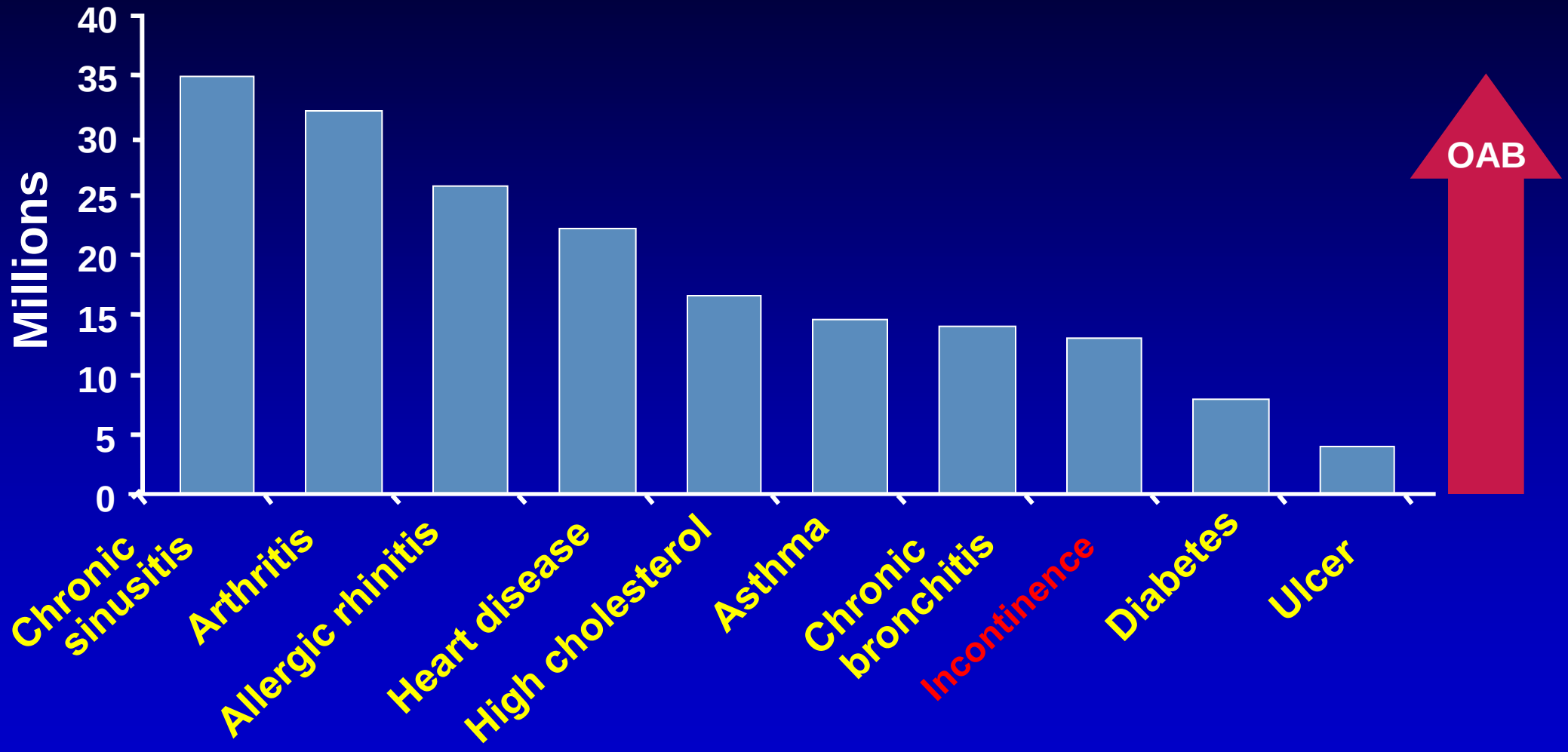
"The involuntary loss of urine which is objectively demonstrable and a social or a hygienic problem."

* The International Continence Society

UI in Older Adults

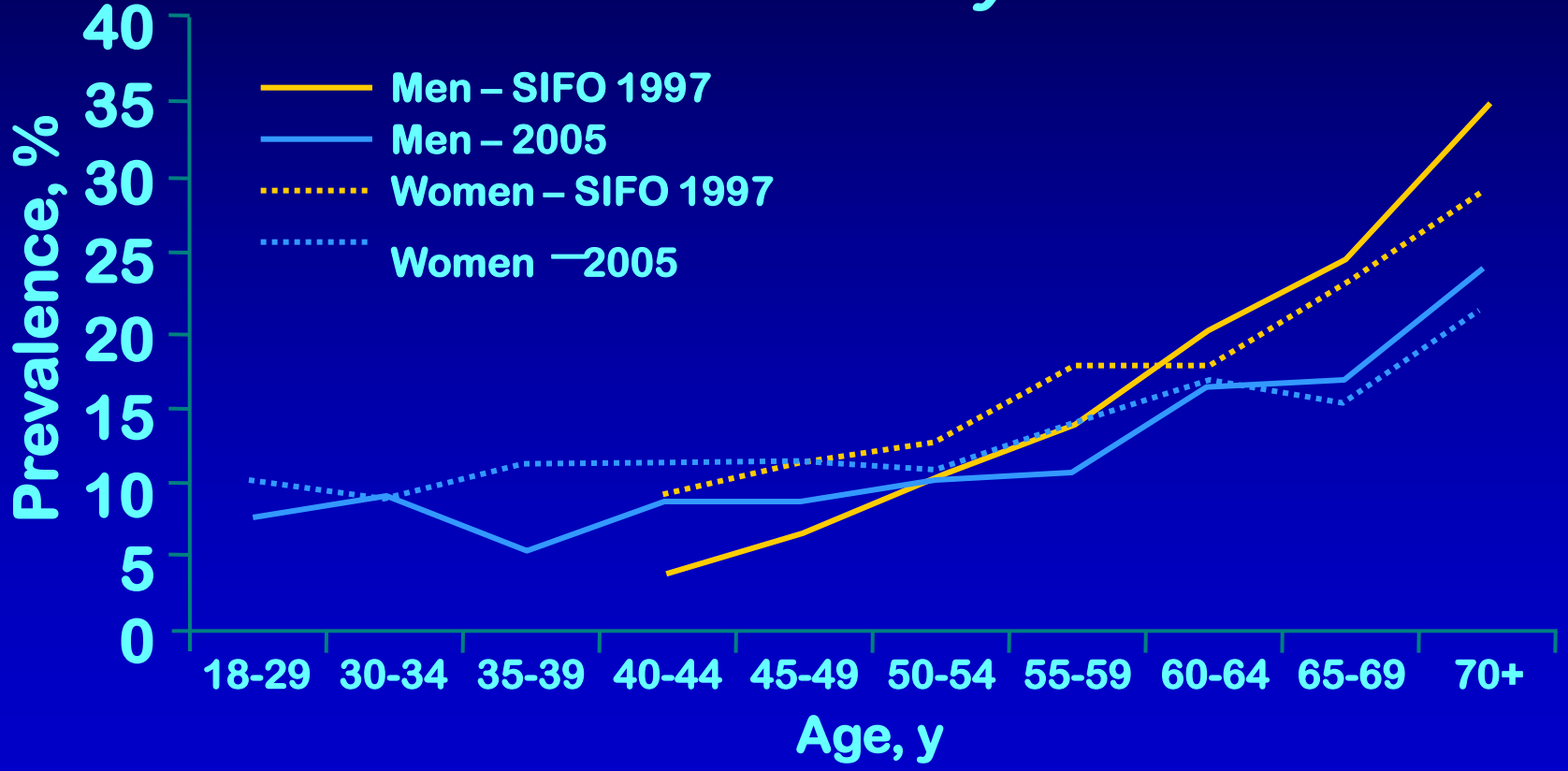
- Number of older adults with UI is increasing rapidly as population ages
  - Estimated to affect over 13 million Americans
- UI may be an early marker of frailty onset
- Prevalence of UI in NH residents ranges from 43-81%
  - Difficult to define 2/2 underreporting.
- By 2050, the number of women likely to experience UI will increase by 46%
  - 27 million people in the US are expected to live in RCF.
- UI is costly – in 2000 the total cost of UI was $19.5 billion – community dwelling (14.2 billion), RCF (5.3 billion)

More Common Than You Think?



OAB Increases With Age

Comparison of Data From the SIFO Study 1997 and the EPIC Study 2005

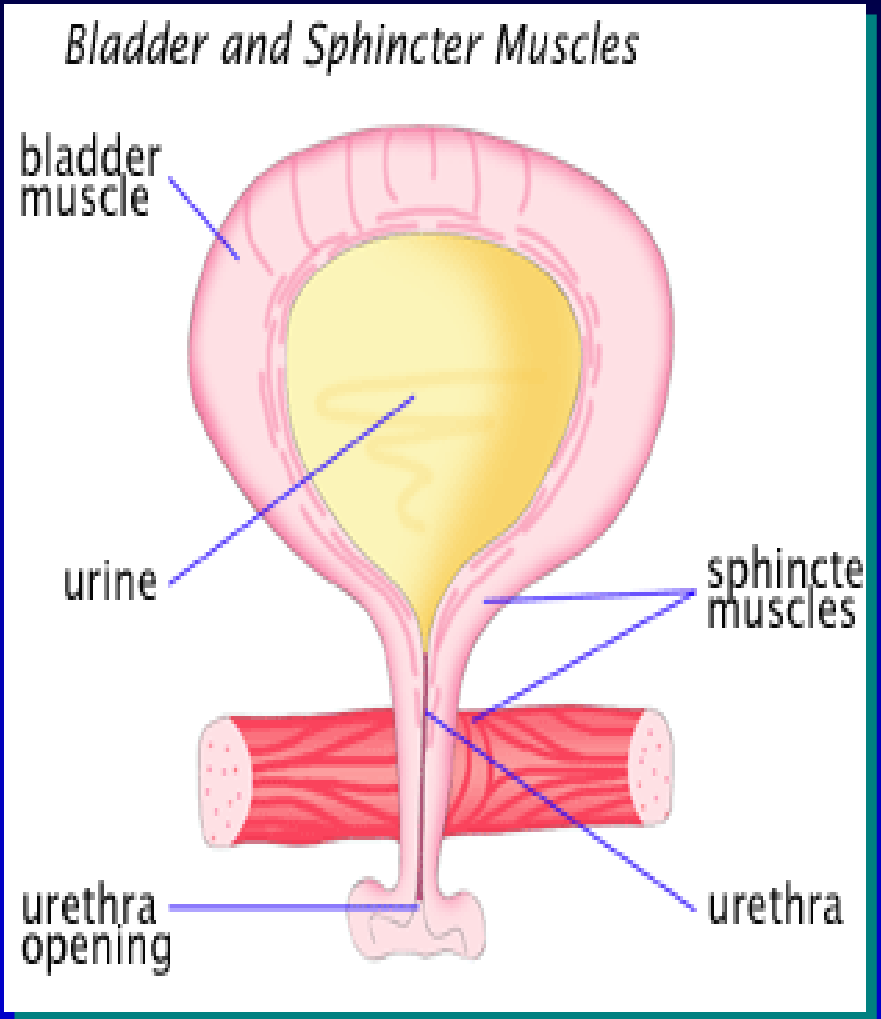


Milsom I et al. *BJU Int.* 2001;87:760-766.
Irwin DE et al. EAU 2006.
EPIC Study. Data of file. Pfizer Inc.

Maintaining continence

- ✓ Lower urinary tract function
- ✓ Mental ability
- ✓ Mobility, Dexterity
- ✓ Environment
- ✓ Motivation

How does it work ?



Cerebral cortex: exercises an inhibitory influence

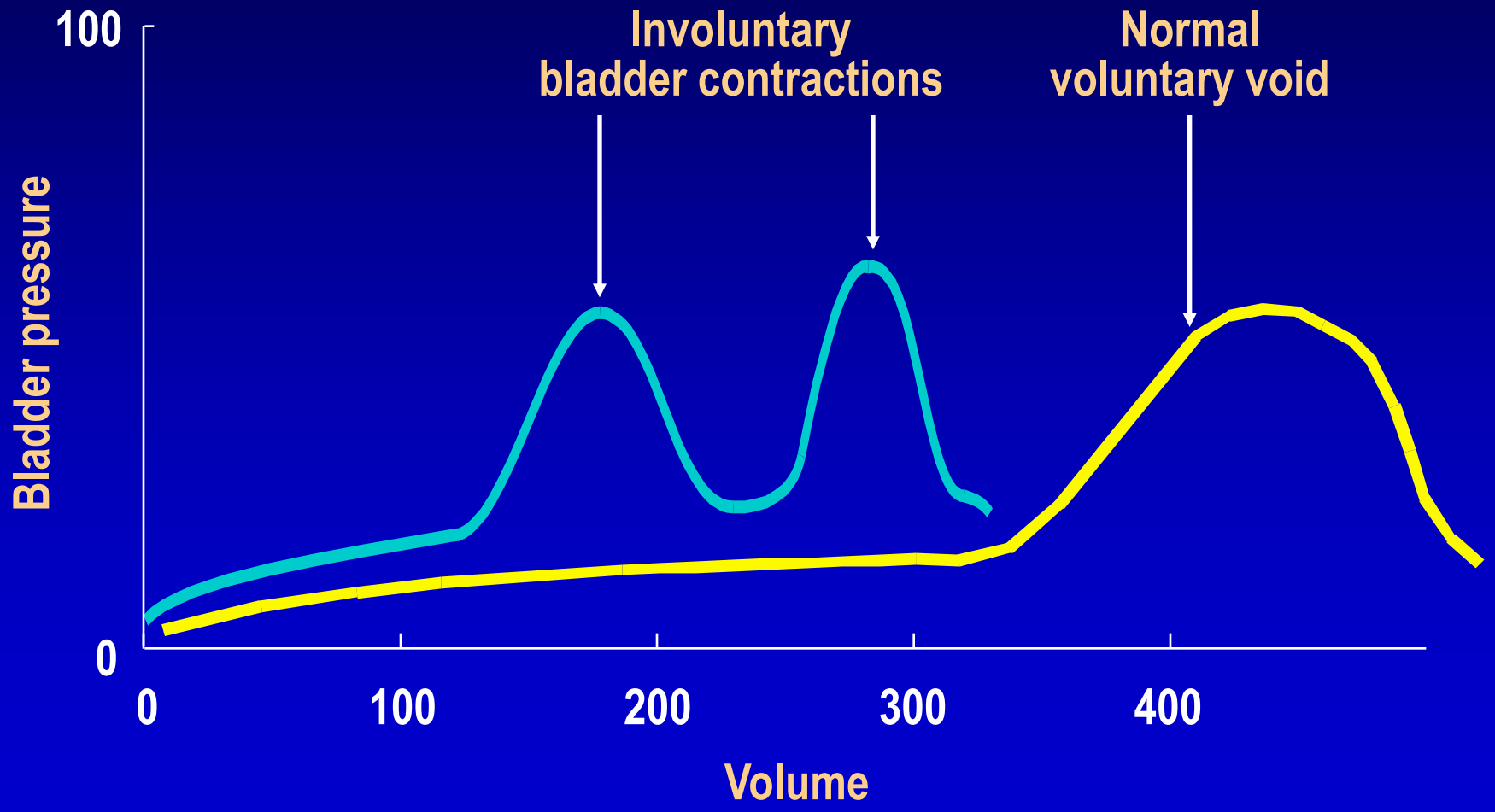
Brain stem: coordinates urethral sphincter relaxation and detrusor contraction

Bladder fills - sympathetic tone contributes to closure of the BN and relaxation of the Detrusor (and inhibits PS tone). Somatic innervation maintains tone in the PF / striated mm around the urethra.

Empties - decreased urethral resistance from diminished sympathetic/somatic tone. PS tone increases and Detrusor ctx ensues.

Most common LUT abnormality

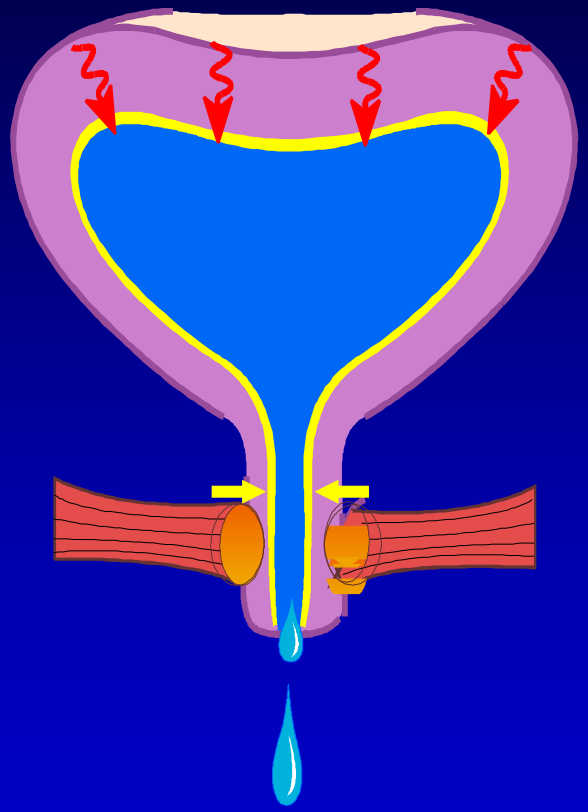
Detrusor Overactivity



Urge UI

Abrams P et al. *Urology*. 2003;61:37-49. Ouslander J. *N Engl J Med*. 2004;350(8):786-799.

The complaint of involuntary leakage accompanied by or immediately preceded by urgency



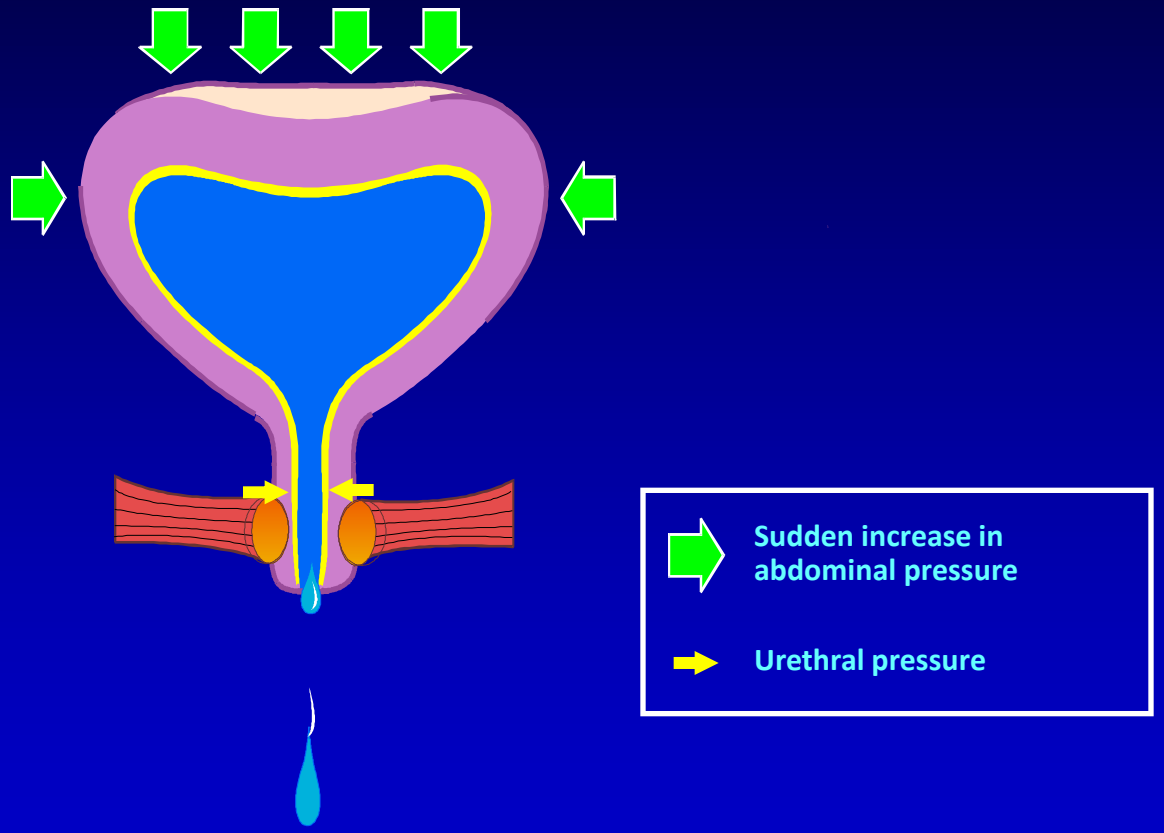
Involuntary detrusor contractions

Urethral pressure

Stress UI

Abrams P et al. *Urology*. 2003;61:37-49.

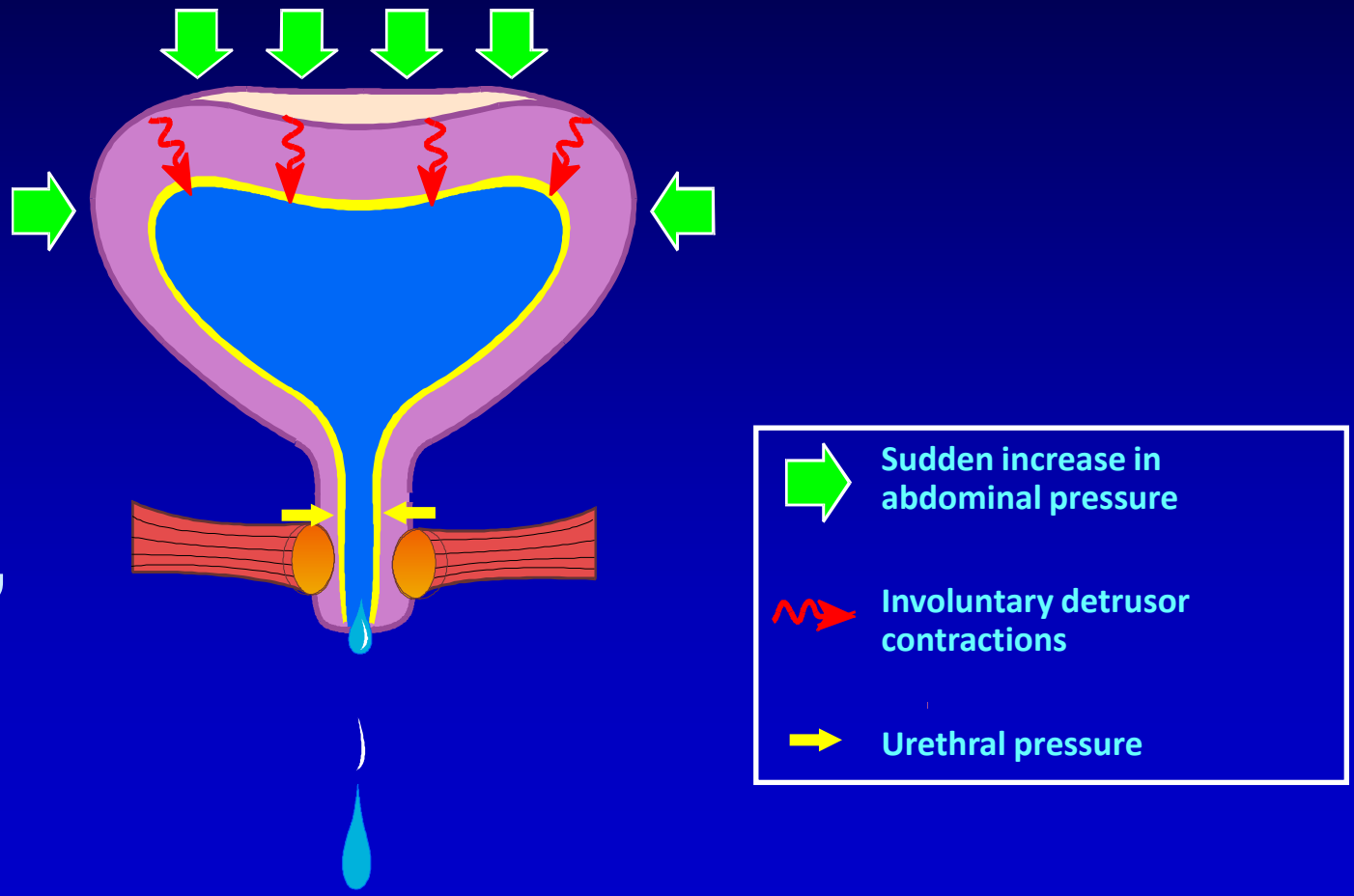
The complaint of involuntary leakage with effort or exertion or on sneezing or coughing



Mixed UI

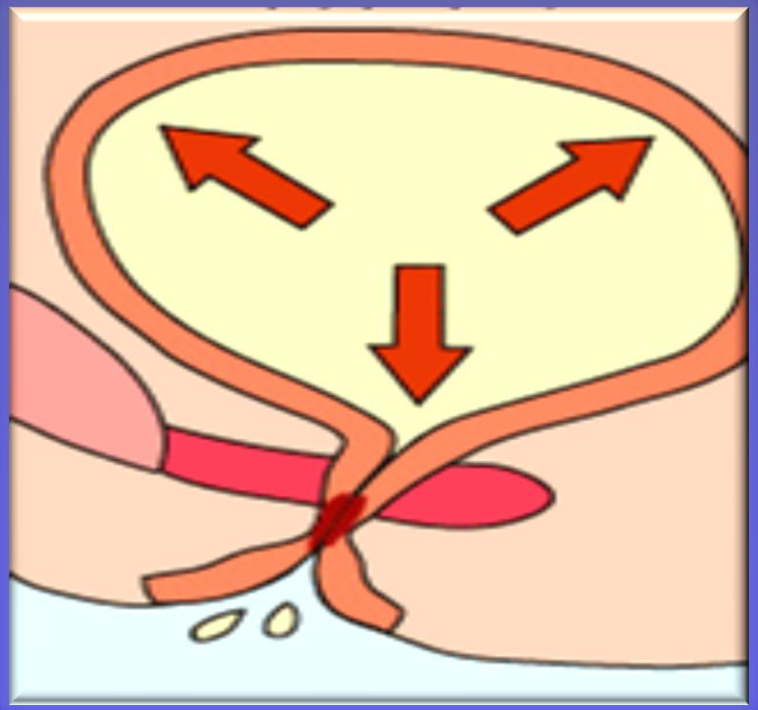
Abrams P et al. *Urology*. 2003;61:37-49. Chaliha C et al. *Urology*. 2004;63:51-57.

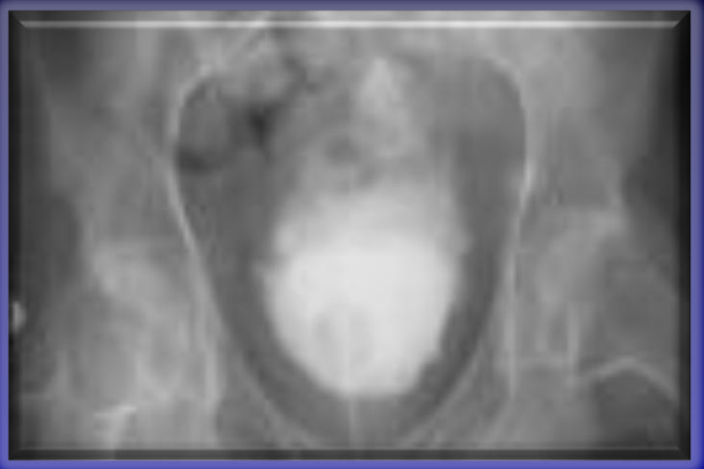
The complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing, or coughing

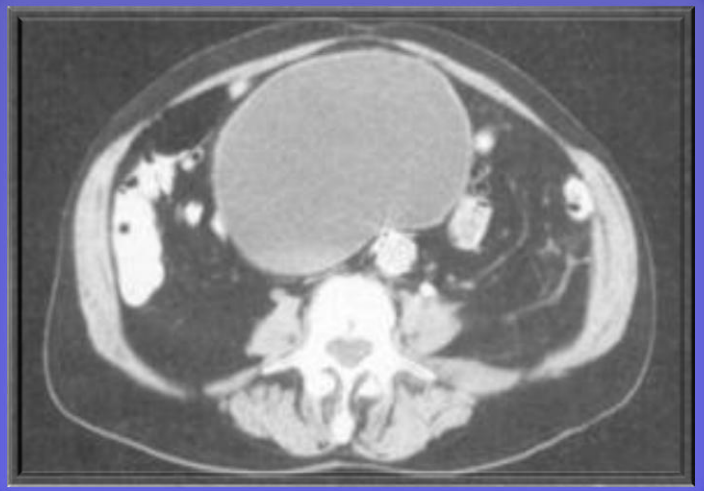


Overflow

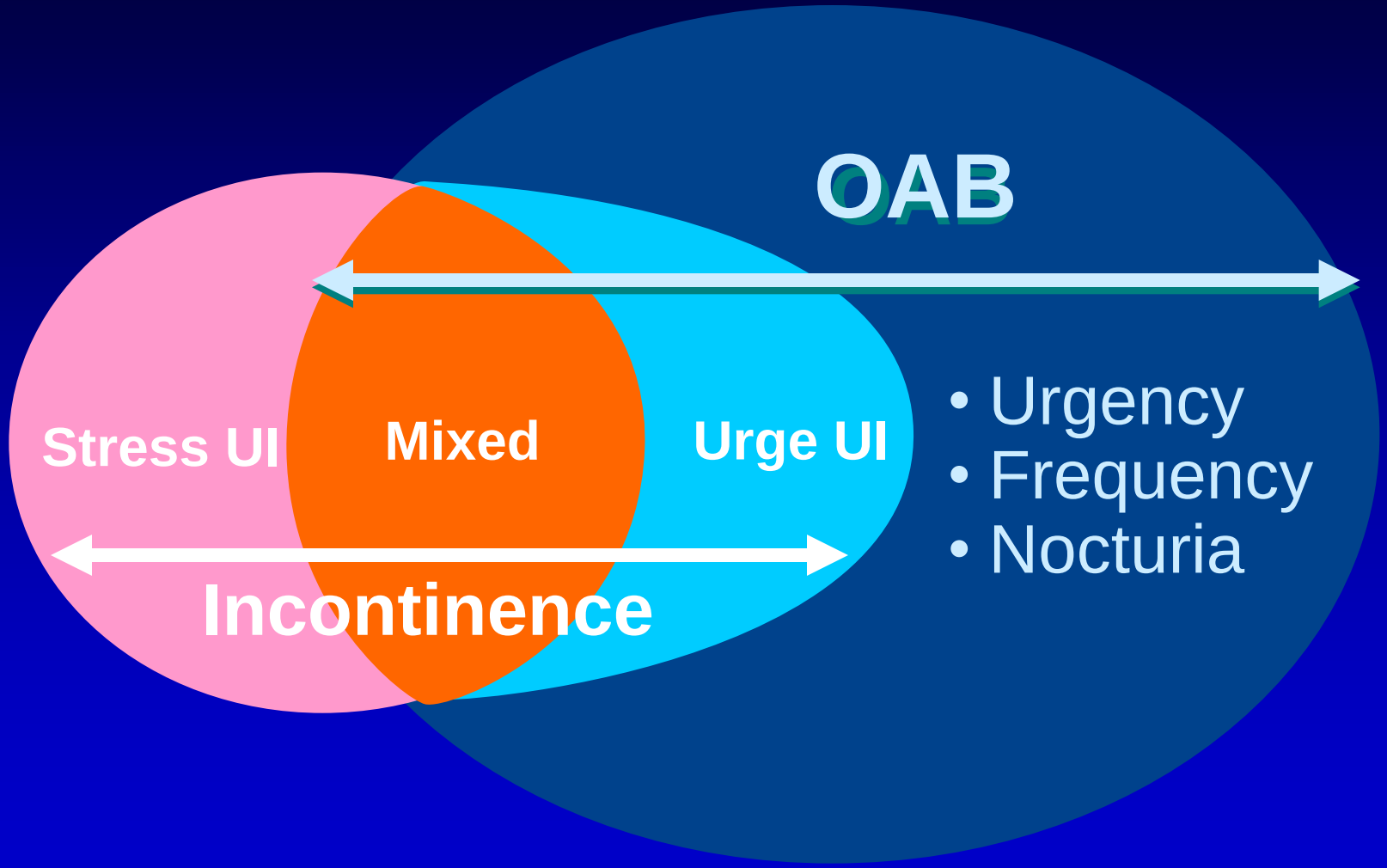
- Anatomic obstruction
- Acontratile bladder (DM / SCI)
- Neurogenic bladder (MS / suprasacral SC lesions



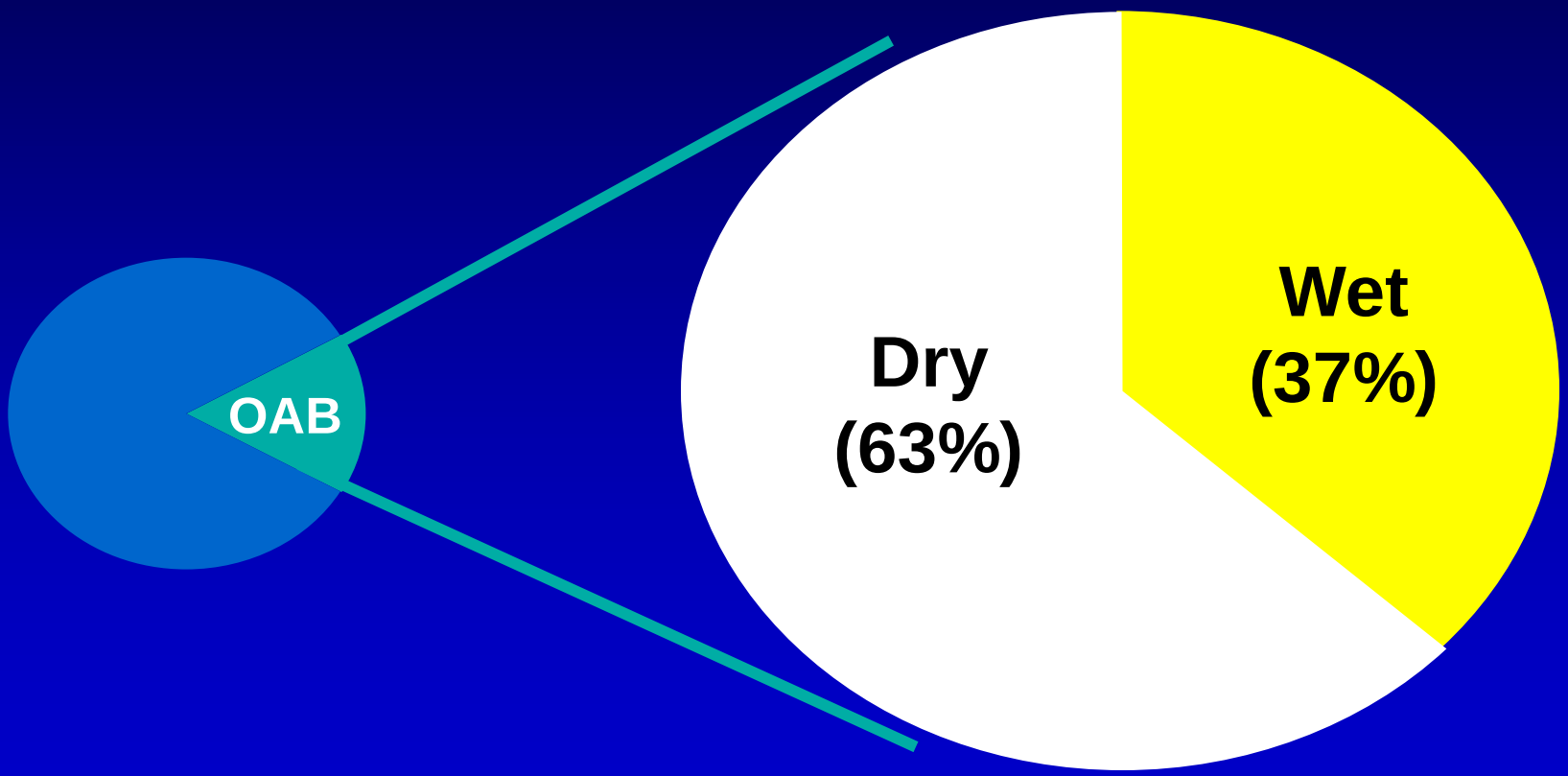




Spectrum of OAB and Urinary Incontinence

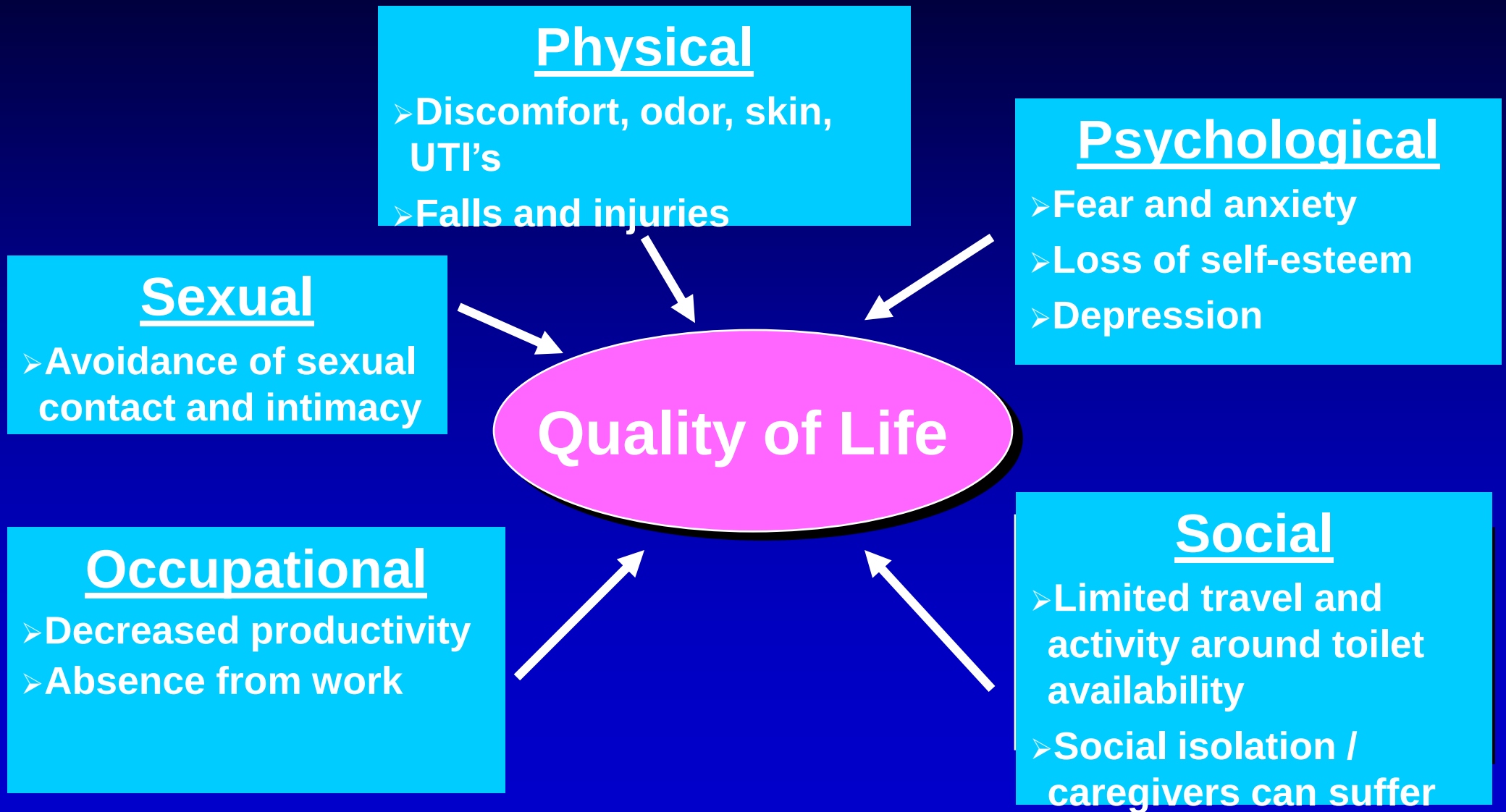


OAB: “Dry” vs “Wet” (Urge Incontinence)



Adapted from Stewart W et al. ICI 2001

Impact of UI & OAB on Quality of Life

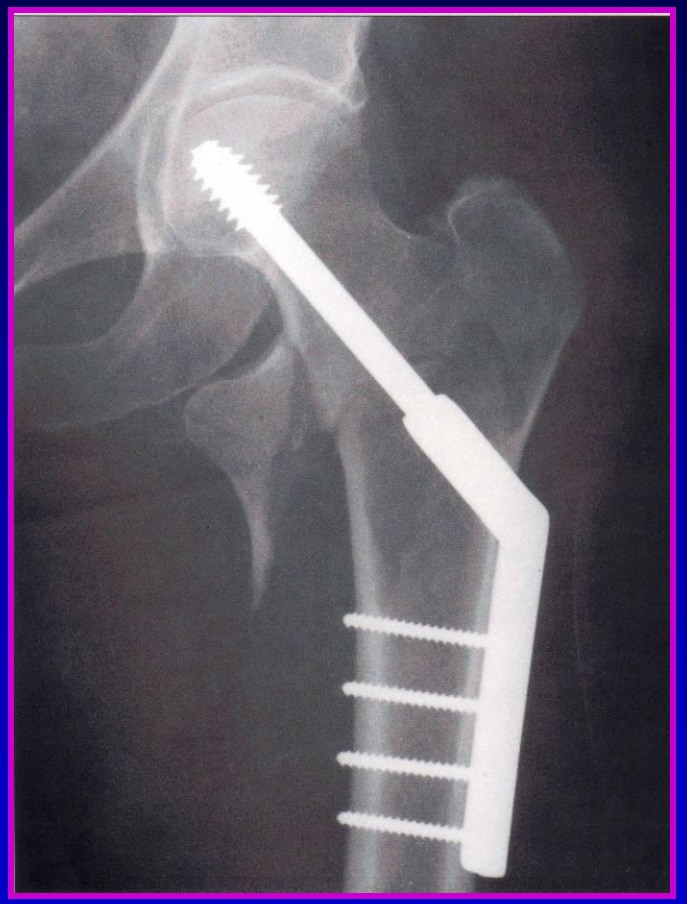


Adverse Consequences of UI & OAB

- 87 Y.O. woman living at home, with minimal assistance from family
- Incontinent rushing to the toilet at 2 a.m., slipped and fell in urine
- Sustained a hip fracture
- Now confined to a wheelchair and required admission to a nursing home

Urge Incontinence, Falls, and Fractures

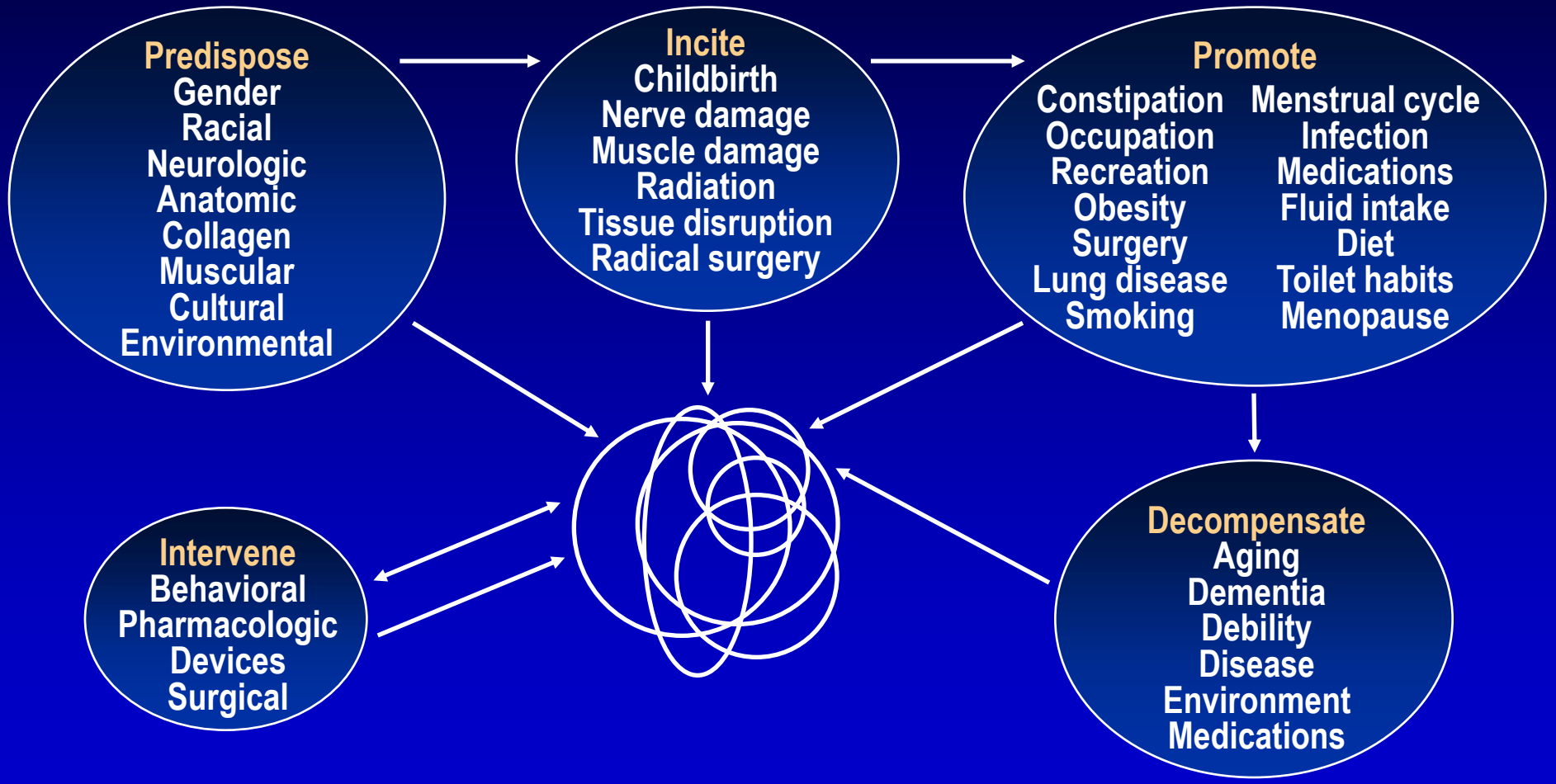
- 6,049 women, mean age 78.5
- 25% reported urge UI (at least weekly)
- Followed for 3 yrs
- 55% reported falls, 8.5% fractures
- Odds ratios for urge UI and
  - ✓Falls: 1.26
  - ✓Non-spine fracture: 1.34



Brown et al: JAGS 48: 721 – 725, 2000

Urinary Incontinence and OAB

Multi-factorial Pathophysiology



Abrams P, Wein A. *Urology*. 1997:50(suppl 6A):16.

Urinary Incontinence & OAB

Pathophysiology

Lower urinary tract

- Bladder pathology (infection, tumor, etc)
- Idiopathic detrusor overactivity
- Women – vaginal atrophy
- Urinary retention
  - Obstruction (functional / anatomic)
  - Impaired bladder contractility

Age-related Changes

- Occurs in both continent and incontinent older patients.
- Mobility and cognition play an important role in compensating for age-related changes:
  - Decreased bladder capacity
  - Reduced voiding volume
  - Reduced flow rates
  - Increased urine production at night

* Nordling, J Experimental Gerontology, 2002, 37:991

Urinary Incontinence & OAB

Pathophysiology

Neurological

- **Brain**
  - Stroke, dementia, Parkinson's, MS
- **Spinal cord**
  - Injury, compression
- **Peripheral neuropathy**
  - Diabetic neuropathy
  - B12 deficiency (less commonly)

Urinary Incontinence & OAB

Pathophysiology

Functional/Behavioral

- Mobility impairment, visual
- Cognitive impairment
- Fluid intake
  - Amount and timing
  - Caffeine, alcohol
- Bowel habits/constipation
- Psychological unwillingness

Urinary Incontinence & OAB

Pathophysiology

Other Conditions

- Diabetes
- Nocturnal polyuria – passage of > 33% of total volume / during sleeping hours.
  - Sleep apnea – natriuretic response
  - CHF
  - Hypoalbuminemia
  - Venous insufficiency
  - NPS – low vasopressin at night
    - 3-4% of population > 65 yo

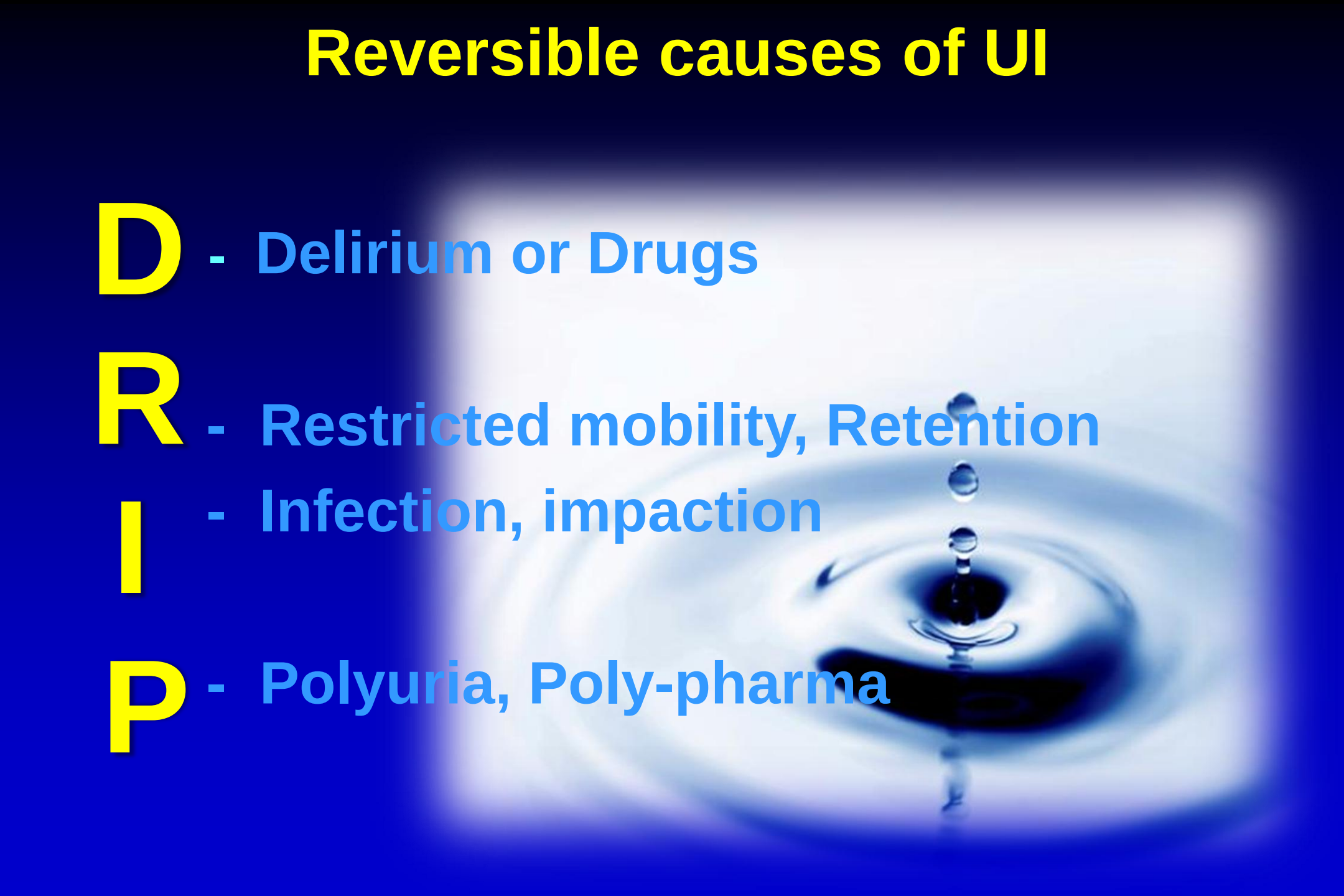
Reversible causes of UI

D - Delirium or Drugs

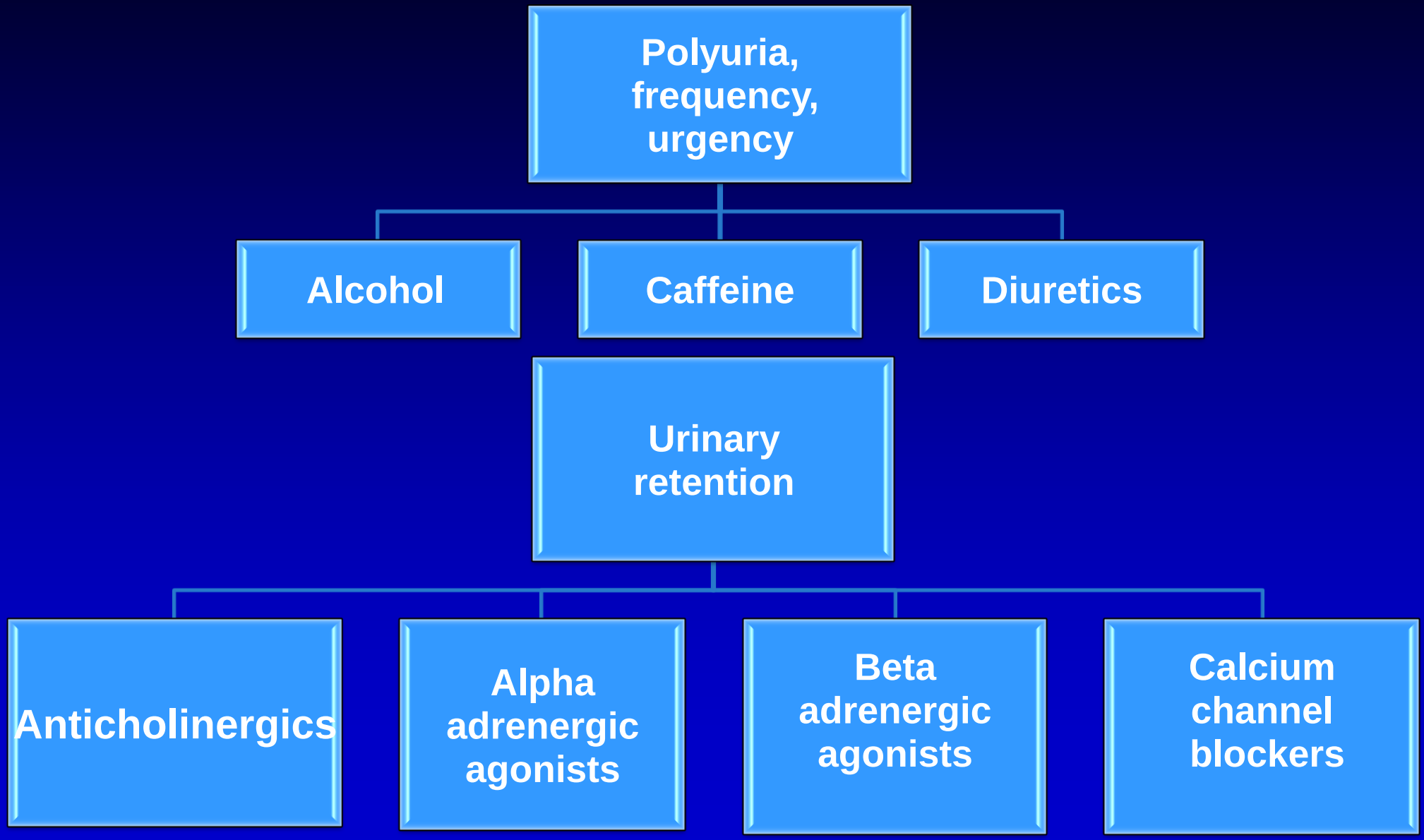
R - Restricted mobility, Retention

I - Infection, impaction

P - Polyuria, Poly-pharma



Drugs Contributing to UI & OAB



Diagnostic Assessment

- History and a bladder diary in selected patients
- Targeted physical exam
- Cough test for stress incontinence
- Urinalysis
- Uroflow (?)
- Measurement of voided and post-void residual volumes (?)
- Labs (?)

History

- Most bothersome symptom (s)
- Medical history for relevant conditions and medications
- Onset and duration of symptoms
- Prior treatment and response
- Characterization of symptoms
  - ✓ Overactive bladder
  - ✓ Stress incontinence
  - ✓ Voiding difficulty
  - ✓ Other (pain, hematuria)
- Bowel habits
- Fluid intake
- Treatment preferences and goals

Physical Exam

- Cardiovascular
- Abdominal
- Directed neuro exam
- External genitalia / perineal skin
- Pelvic exam
  - ✓ Atrophic vaginitis
  - ✓ Pelvic organ prolapse
- Rectal exam

Post-Void Residual Determination

- Diabetics
- Neurological conditions
  (e.g. post acute stroke, multiple sclerosis, spinal cord injury)
- Anticholinergics and narcotics
- History of urinary retention or elevated PVR

Urinary Incontinence and OAB

Examples of criteria for specialist evaluation

- ✓ Recurrent UTI
- ✓ Recent pelvic surgery
- ✓ Severe pelvic organ prolapse
- ✓ Sterile hematuria
- ✓ Urinary retention / elevated PVR
- ✓ Failure to respond to initial therapy and desire for further improvement

Management of Incontinence and OAB

- Rx Reversible causes
- Supportive measures
  - ✓ Education
  - ✓ Environmental
  - ✓ Toilet substitutes
  - ✓ Catheters
  - ✓ Garments/pads
- Surgical interventions
- Behavioral interventions
- Pharmacologic therapy
- Devices
- Preferences

Treat Reversible Causes

- **Modify fluid intake**
  - **Don’t reduce amount.**
- **Modify drug regimens (if feasible)**
- **Reduce volume overload (for nocturia)**
  - ✓ **e.g. take furosemide in late afternoon in patients with nocturia and edema**
- **Treat:**
  - ✓ **Infection (new onset or worsening symptoms)**
  - ✓ **Constipation**
  - ✓ **Atrophic vaginitis**

Supportive Measures

- **Education / expectations**
- **Environmental**
  - ✓ **Clear and well-lit path to toilet**
  - ✓ **Bedside commodes / urinals**
- **Catheters (?)**
  - ✓ **Retention (surgery not appropriate), palliative care, patient or caregiver unable to manage intermittent cath**
- **Garments/pads**

Undergarments and Pads

- Nonspecific
- Foster dependency ?
- Expensive

Management of Incontinence and OAB

Surgical Interventions

- **Stress incontinence**
  - Peri-urethral injections
  - Bladder neck suspension
  - Sling procedure – Gold standard

- **Urge incontinence**
  - Implantable stimulators
  - Botulinum toxin

Management of Incontinence and OAB

Behavioral Interventions

- **"Bladder Training"**
  - Education
  - Bladder drills/ Timed voiding/deferment technique
  - Urge inhibition techniques (distraction, relaxation, pelvic muscle contraction)
  - Pelvic muscle rehabilitation
    - ✓ With and without biofeedback
- **Toileting programs (cognitively impaired)**
  - Prompted voiding

Pelvic Floor Muscle Exercises

- Success depends upon consistent isolation of the pelvic floor muscles
- However, many older women cannot get the “knack” of identifying the correct muscles and using them without raising intra-abdominal pressure or contracting buttock / thigh muscles.
- PT referral may be beneficial
  - (?) Role of biofeedback to help with isolation vs. simply giving the patient detailed instructions
- Moderate repetitions of strongest contraction possible

Pelvic Muscle Exercises

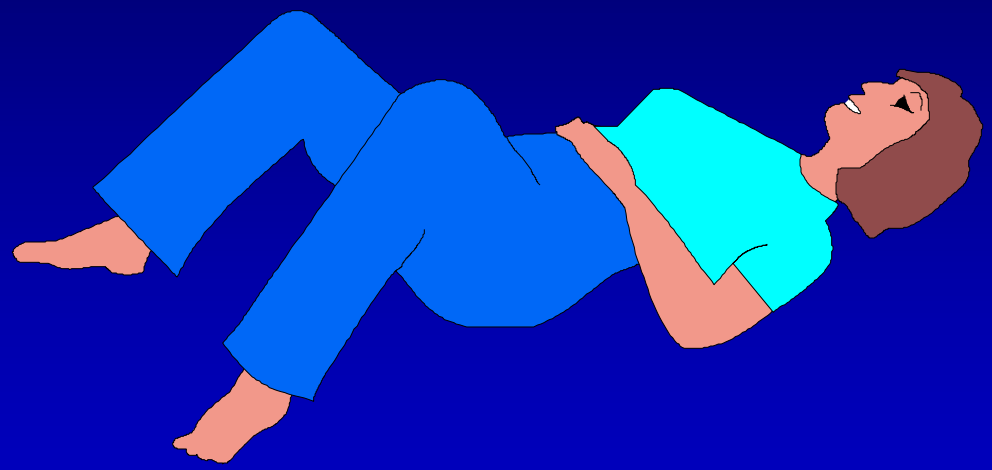
Locate pelvic muscles

Squeeze muscles tightly for up to 10 seconds

Relax completely for at least 10 seconds

Repeat in sets of up to 10

3-4 times/day, and use in everyday life



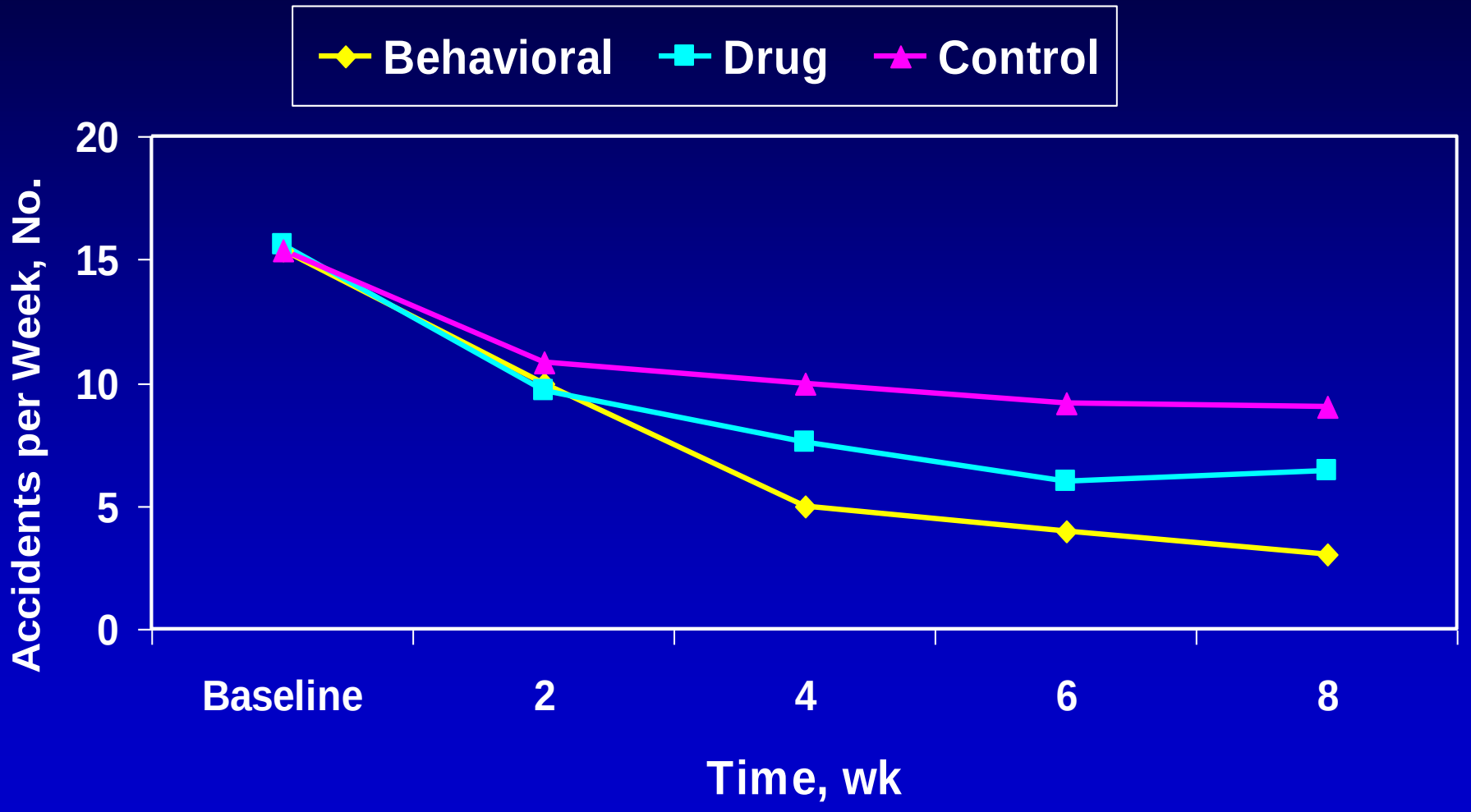
Randomized Trials of Behavioral Treatment for Stress UI

- 24 RCTs, but only 11 of high quality
- Pelvic floor exercises were effective (up to 75%) in reducing symptoms of SUI
- Limited evidence for high vs low intensity
- Benefits of adding biofeedback unclear

Berghmans et al. Br J Urol 1998:82:181-191

Behavioral intervention and OAB

Behavioral training w/ BF vs. Oxbutynin IR



Burgio et al: JAMA 280: 1998 (Pts were 55-92. no dementia. Ambulatory)

Management of Incontinence and OAB

Behavioral vs. Drug Treatment

Patient Perceptions	Behavior	Drug	Control
Much better	74	51	27
Better	26	31	39
Able to wear fewer pads	76	56	34
Completely satisfied	78	49	28
Continue treatment	97	58	43
Wants a different option	14	76	76

Burgio et al: JAMA 280: 1998

Limitations of Behavioral Treatment Studies

- Studies vary:
  - types of UI / characteristics of subjects
  - Intervention / treatment strategies
  - outcome measures / duration of follow-up
- Few studies: PFME performed with and without biofeedback
  - PF mm exercises will improve UI regardless
  - BF requires expensive equipment / personnel.
    - Invasive / uncomforable
    - Reimbursment issues

Are behavioral techniques effective? For whom?

- Behavioral techniques effective for treatment of SUI / UUI/ OAB but generally do not cure
- Classified into “patient-dependent” and “care-giver dependent”
- Behavioral techniques are effective in community dwelling women and emerging evidence to say they may help in the RC setting.
- Behavioral techniques are traditionally most appropriate for cognitively intact (capacity to learn) and motivated persons

Prompted Voiding

Protocol

- Typically for dependent patients.
- Opportunity (prompt) to toilet every 2 hours
- Toileting assistance if requested
- Social interaction and verbal feedback
- Encourage fluid intake

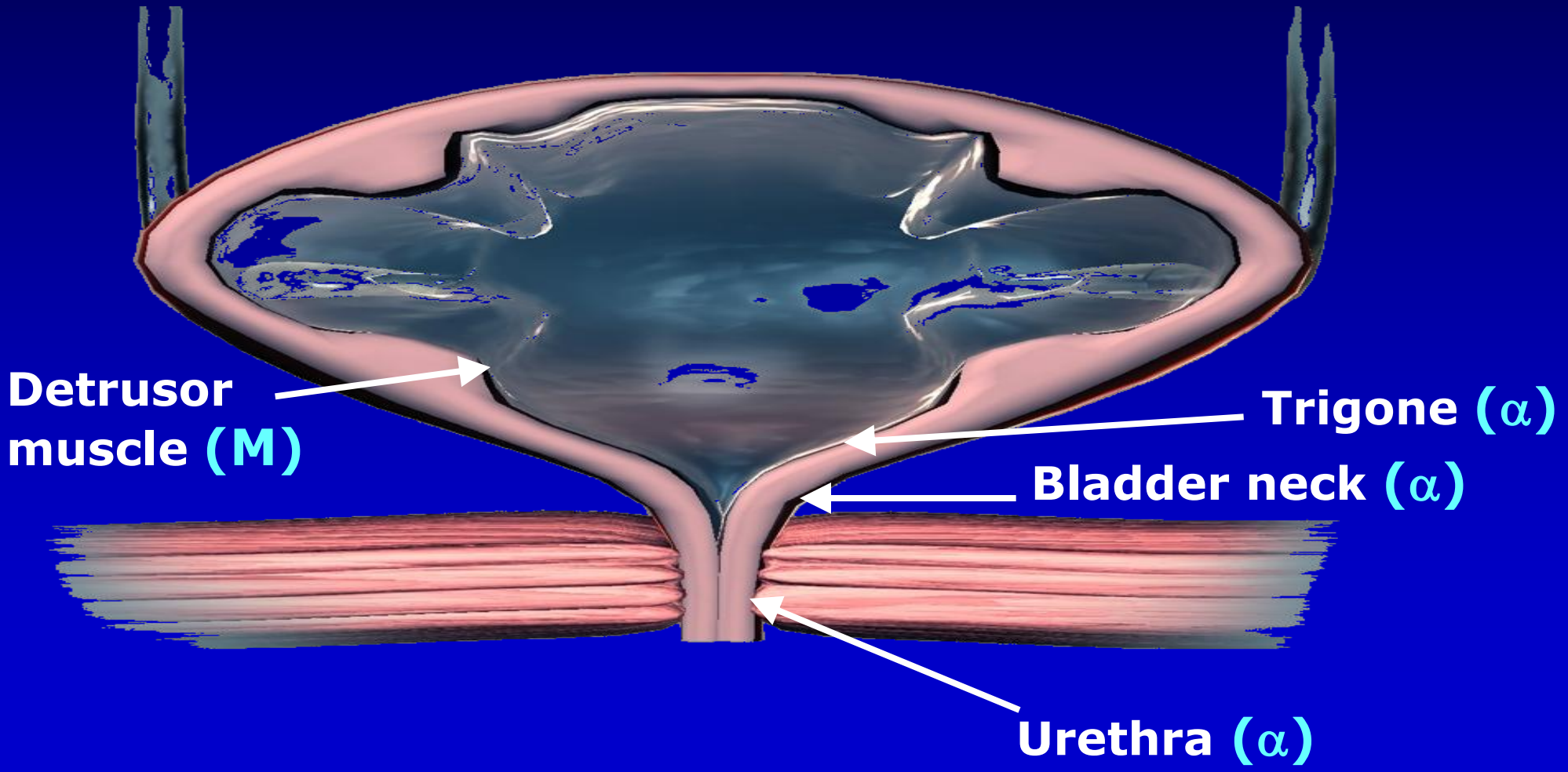
Prompted Voiding

- 25%-40% of frail nursing home patients respond well
  - ✓UI episodes decrease from 3 or 4 per day to 1 or fewer
- Responsive patients can be identified during a 3-day trial

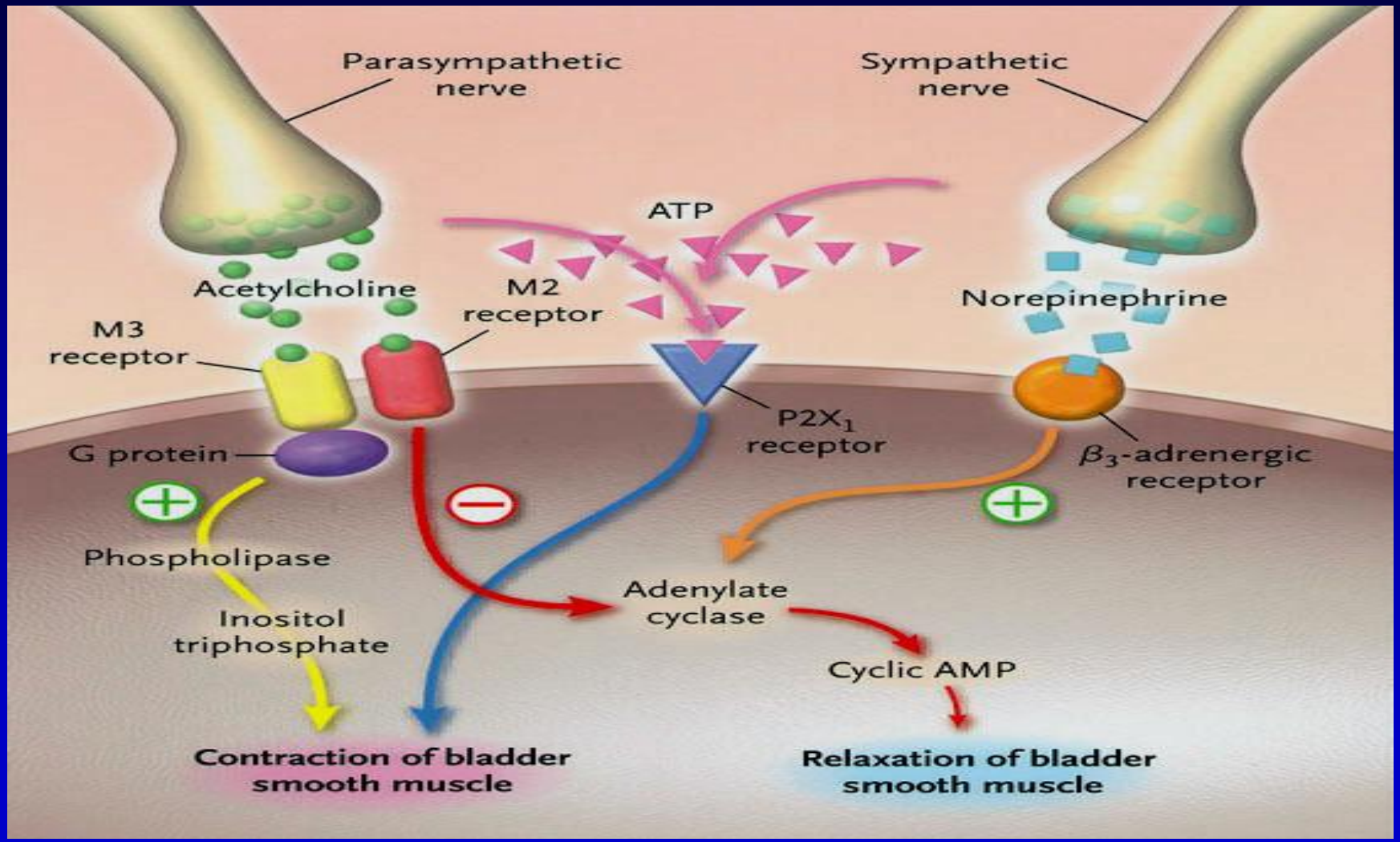
Ouslander JG et al. *JAMA* 273:1366-70

Lower Urinary Tract Cholinergic and Adrenergic Receptors

M=muscarinic $\alpha=\alpha_1$-adrenergic

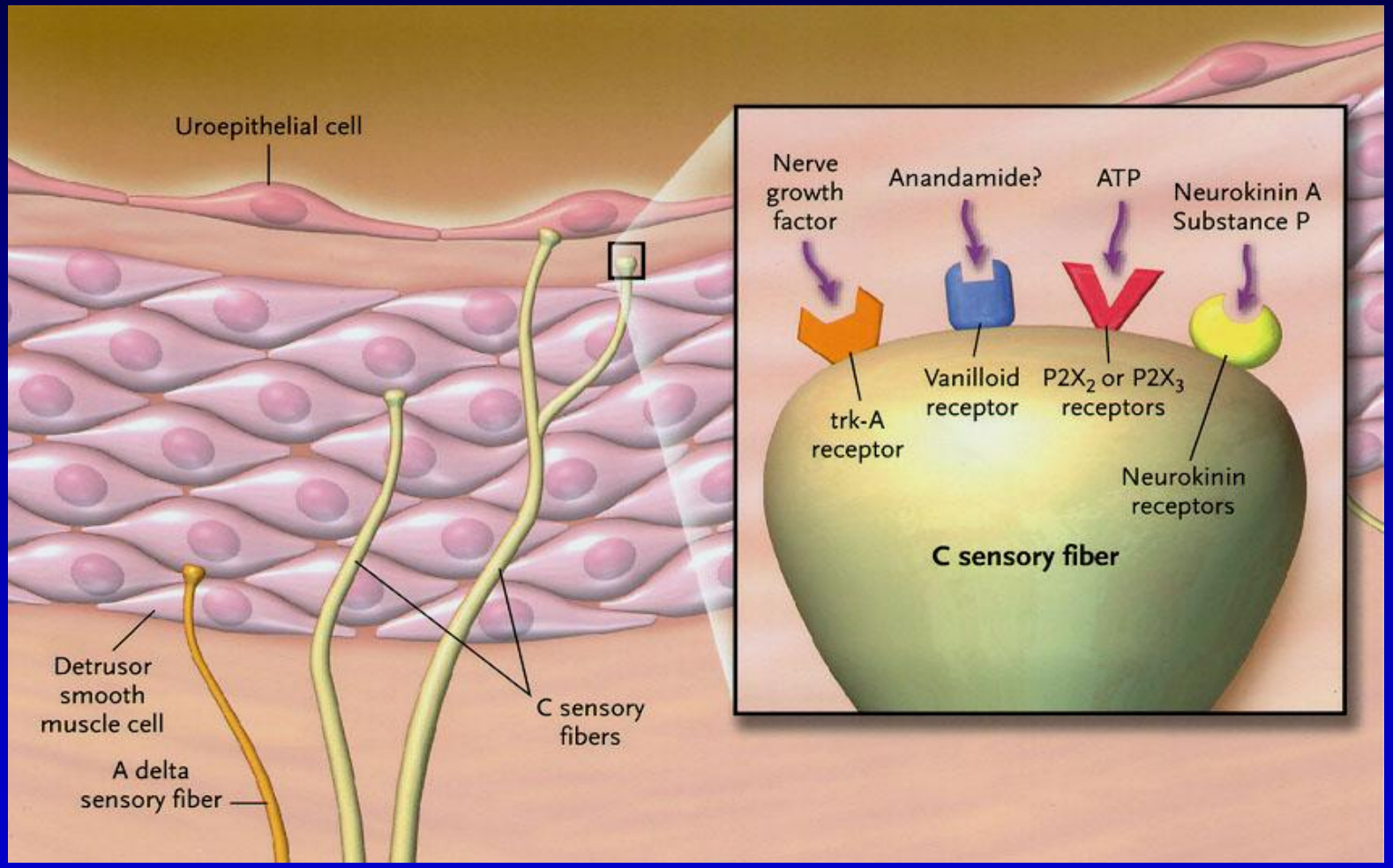


Motor Innervation of the Bladder



Ouslander J. *N Engl J Med*. 2004;350:786-799

Sensory Innervation of the Bladder



Ouslander J. *N Engl J Med*. 2004;350:786-799

Drug Therapy for Stress Incontinence

- Limited efficacy
- Two basic approaches:
  - ✓ Estrogen to strengthen periurethral tissues (not effective by itself)
  - ✓ Alpha adrenergic drugs to increase urethral smooth muscle tone (no drugs are FDA approved for this indication)
    - Pseudoephedrine ("Sudafed")
    - Duloxitene ("Cymbalta")
    - Phenylpropanolamine

Drug Therapy for Urge UI and OAB

- Antimuscarinic "Anticholinergics"
- α-Blockers
  - Off label use in women with certain forms of voiding dysfunction
- Estrogen (topical)
  - May be a helpful adjunct for women with vaginal atrophy
  - HERS study: 2763 PM women given combined HRT vs. placebo for prevention of recurrent CAD.
    - HRT group had worsening stress and urge UI.
- DDAVP (Off label in the U.S.)
  - Carefully selected patients with primary complaint of nocturia
  - Caution in elderly: contraindicated in Pt's with CHF, HTN, ischemic heart dz

Drug Therapy for Urge UI and OAB

- Darifenacin (“Enablex”)
- Oxybutynin (“Ditropan”)
  - IR
  - ER (“ XL”)
  - Patch (“Oxytrol”)
  - Gel (“GeInique”)
- Solifenacin (“Vesicare”)
- Tolterodine (“Detrol”)
  - IR
  - Long-acting (“LA”)
- Trospium (“Sanctura”)
- Mirabegron (“Myrbetriq”)

Drug Therapy for UI and OAB

- Several factors influence the decision to use pharmacologic therapy:
  - ✓ Degree and bother of symptoms
  - ✓ Patient/family preference (provider preference)
  - ✓ Risk for side effects/co-morbidity
  - ✓ Responsiveness to behavioral interventions
  - ✓ Cost

Drug Therapy for Urge UI and OAB

- **Anticholinergics: meta-analysis**
  - **32 trials; most double-blind; 6,800 subjects**
  - **Significant effects on:**
    - ✓ **Incontinence and voiding frequency**
    - ✓ **Cure/improvement**
    - ✓ **Bladder capacity**
  - **Modest clinical efficacy vs. placebo**
  - **Measured over short time periods**

Herbison P, et al. BMJ. 2003;326:841-844

Drug Therapy for Urge UI and OAB

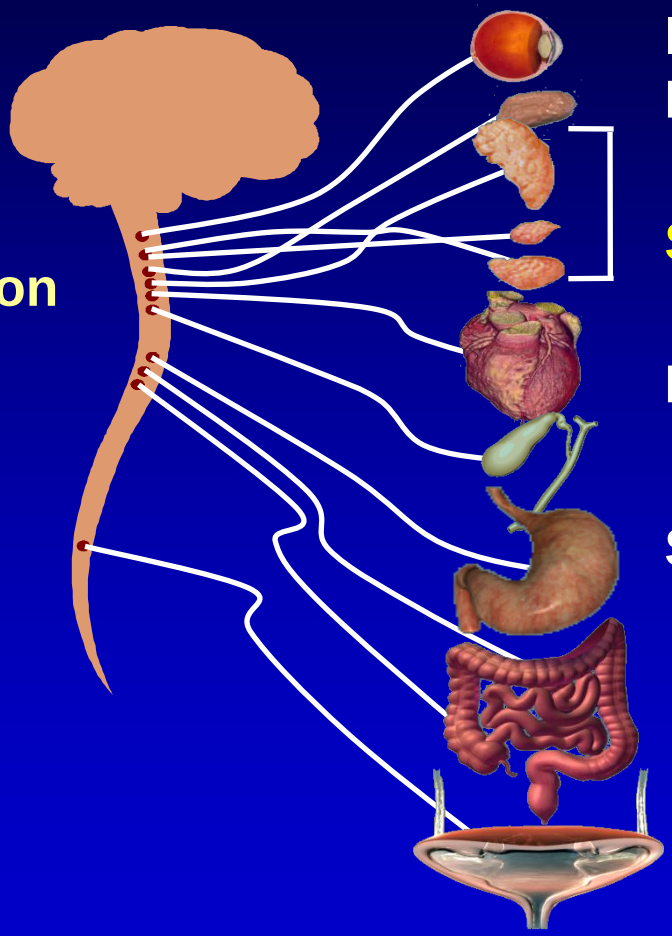
- Efficacy
  - ~ 60 - 70% reduction in urge UI
  - ~ 30 - 50% placebo effect
- Efficacy is similar in elderly vs. younger
- Probably underutilized in the LTC population (7%) J Am Med Dir Assoc 2007; 8: 98–104
- Adverse events
  - Dry mouth ~ 20-25% (~ 5% “severe”)
- What defines success / failure?
  - PT’s less likely to remain on OAB meds than any other drug class (28% still on meds at 6 months)

Potential Side Effects of Antimuscarinic Drugs

CNS

Somnolence

Impaired Cognition



Iris/Ciliary Body = Blurred Vision

Lacrimal Gland = Dry Eyes

Salivary Glands = Dry Mouth

Heart = Tachycardia

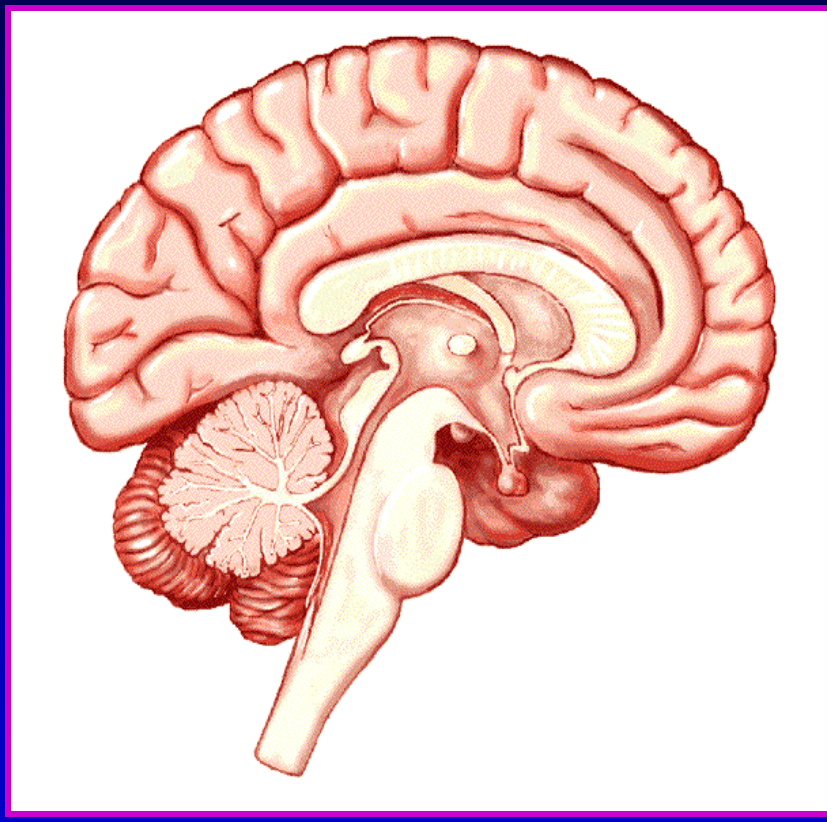
Stomach = GERD

Colon = Constipation

Bladder = Retention

Antimuscarinics and Cognition

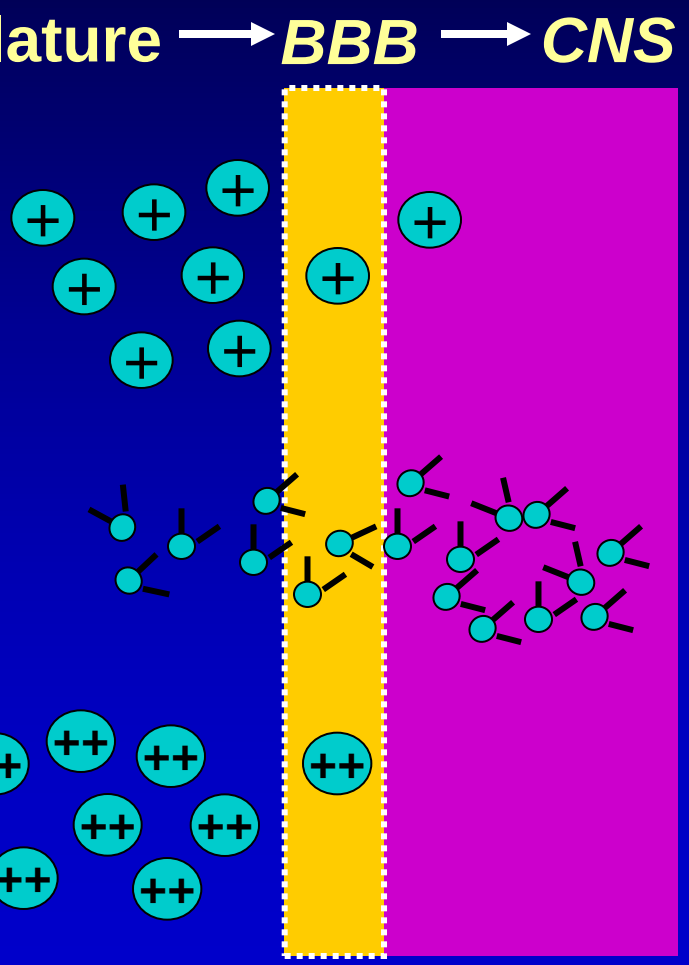
- ACh is a pivotal mediator of short-term memory and cognition
- Cholinergic system involvement in Alzheimer's disease has been clearly established
- Of the 5 muscarinic receptors M_1 appears most involved in memory and learning
- Antimuscarinic drugs used for the bladder can cause cognitive impairment (short-term)
- Recent study by Gray et al found that higher cumulative anticholinergic use is associated with an increased risk for dementia (TCAs, 1st gen antihistamines, bladder antimuscarinics)



Int J Clin Pract 2008, 62, 11, 1792–1800
JAMA Intern Med. 2015;175(3):401-407

Antimuscarinic Drugs and Cognition

BBB permeability increased with advanced age, stress, and disease



Tolterodine

- Low lipophilicity
- Charged
- Relatively "bulky"

Oxybutynin, Solifenacin

- High lipophilicity,
- Neutral
- Relatively "small"

Trospium

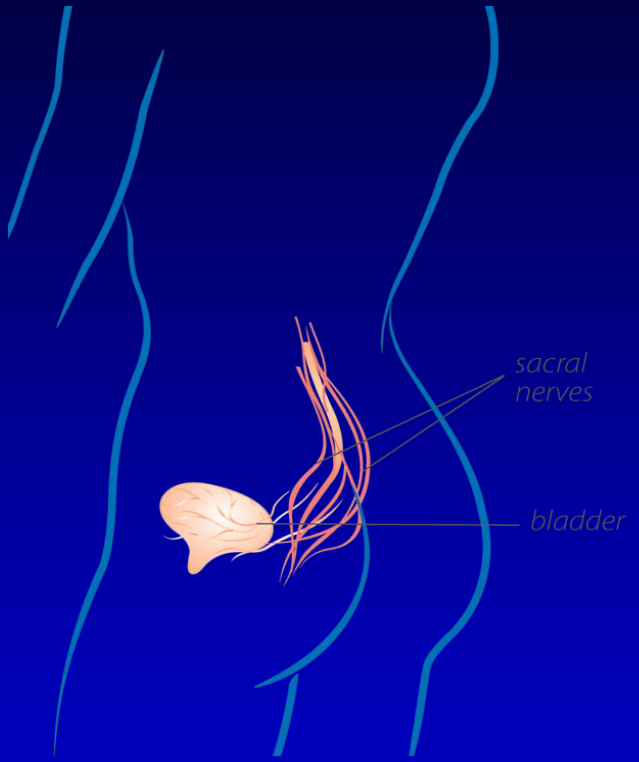
- Relatively "bulky"
- Highly polar

Darifenacin

- Lipophilic, small
- "M3 selective"

Sacral Nerve Stimulation

- Focuses mild electrical pulses on the nerves that control the pelvic floor and lower urinary tract [1,2*]
- Offers control of symptoms through direct modulation of the nerve activity, making it different from oral medications that target the muscular component of urinary control[1,2*]



1. Griebling TL. Neuromodulation: mechanisms of action. In: Kreder K, Dmochowski R, eds. *The Overactive Bladder: Evaluation and Management.* London, England: Informa UK Ltd; 2007:293-302.
2. Leng WW, Chancellor MB. How sacral nerve stimulation neuromodulation works. *Urol Clin N Am.* 2005;32:11-18.

* While the precise mechanism of action for InterStim has not been fully established, efficacy has been proven in clinical studies.

Botulinum toxin

- Believed that BTX inhibits release of ACh
- Thought to address both Det muscular component as well as the hypersensitve bladder afferent nerves
- Local anesthesia

Avoiding UI Complications in LTC

- Admission to a skilled nursing setting (e.g., an assisted living or a nursing home) should trigger an assessment of UI :
  - Review of medical records
  - Speaking to the hospital discharge primary nurse or physician
  - **Studies show that containment products are the primary strategy employed in LTC settings to manage UI**
- Incontinent residents often not adequately assessed for UI
  - only 2% of women have pelvic exam
  - less than 15% receiving a DRE
  - less than 1% assessed for UI characteristics

Treatment preferences in LTC

- "an informed patient's perspective must be respected" – in practice many LTC health providers select UI Rx – w/o input.
- Wide variation within and between groups
  - Most preferred noninvasive strategies
  - Older adults preferred to a greater degree treatments directed at the cause i.e. meds
  - Despite data documenting diapering as less time intensive / and the challenge of maintaining toileting programs – Nurses preferred PV to diapering.
  - Family members / older adults viewed PV as "embarrassing" and "fostering dependence".

Johnson, et al J Am Geriatr Soc 49:710-718 2001

Treatment preferences in LTC

Pfisterer, et al J Am Geriatr soc 55: 2016-2022 2007

- Most respondents preferred diapers, meds, PV, to catheters. 64% preferred PV to diapers
- Equal proportions preferred meds vs. diapers
- HC proxies expressed greater preference for PV than for diapers than patients did.
- Spouses showed moderate to almost perfect agreement with patients.

Summary

1. UI and OAB are common conditions in the geriatric population, and are associated with considerable morbidity and cost
2. The pathophysiology is multi-factorial
3. All patients should have a basic assessment
4. Variety of treatment options: behavioral interventions and drug therapy for urge UI and OAB are most commonly prescribed
5. Treatment should be guided by patient preference, most bothersome symptoms, and etiology
6. Improving physical functional status may improve UI for older women even with cognitive defects.