Urinary Incontinence

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- 20 million women and 6 million men in America will experience urinary incontinence at some point in their lives
- Prevalence increases with age
- It is NOT a normal result of aging

Socioeconomic burden

- Negative impact on health related quality of life
- Contributes to depression, falls and admission to nursing home
- Annual cost in the US is estimated to be $32 billion
- Largest contributor is the cost of pads, diapers & bedding

Urinary Incontinence in Women. BMG 2014:349

Types of incontinence

- Stress
- Urge
- Mixed
- Overflow
- Functional

STRESS

- Loss of urine with physical exertion, sneezing or coughing
- Caused by sphincter weakness which leads to ineffective function
- Most common cause of urinary incontinence in younger women
- 2nd most common cause in older women with 10% middle aged women having daily symptoms
- Common after prostate surgery in men

URGE

- Overactive Bladder Syndrome
  - Dry – frequency & urgency without leakage
  - Wet – urgency with leakage and nocturia
- NOBLE Study
  - Phone interview over 5000 adults
  - Overall prevalence of urge incontinence is 7-33%
  - Overactive bladder syndrome wet is more common in women 9.3% vs. 2.6% men

URGE

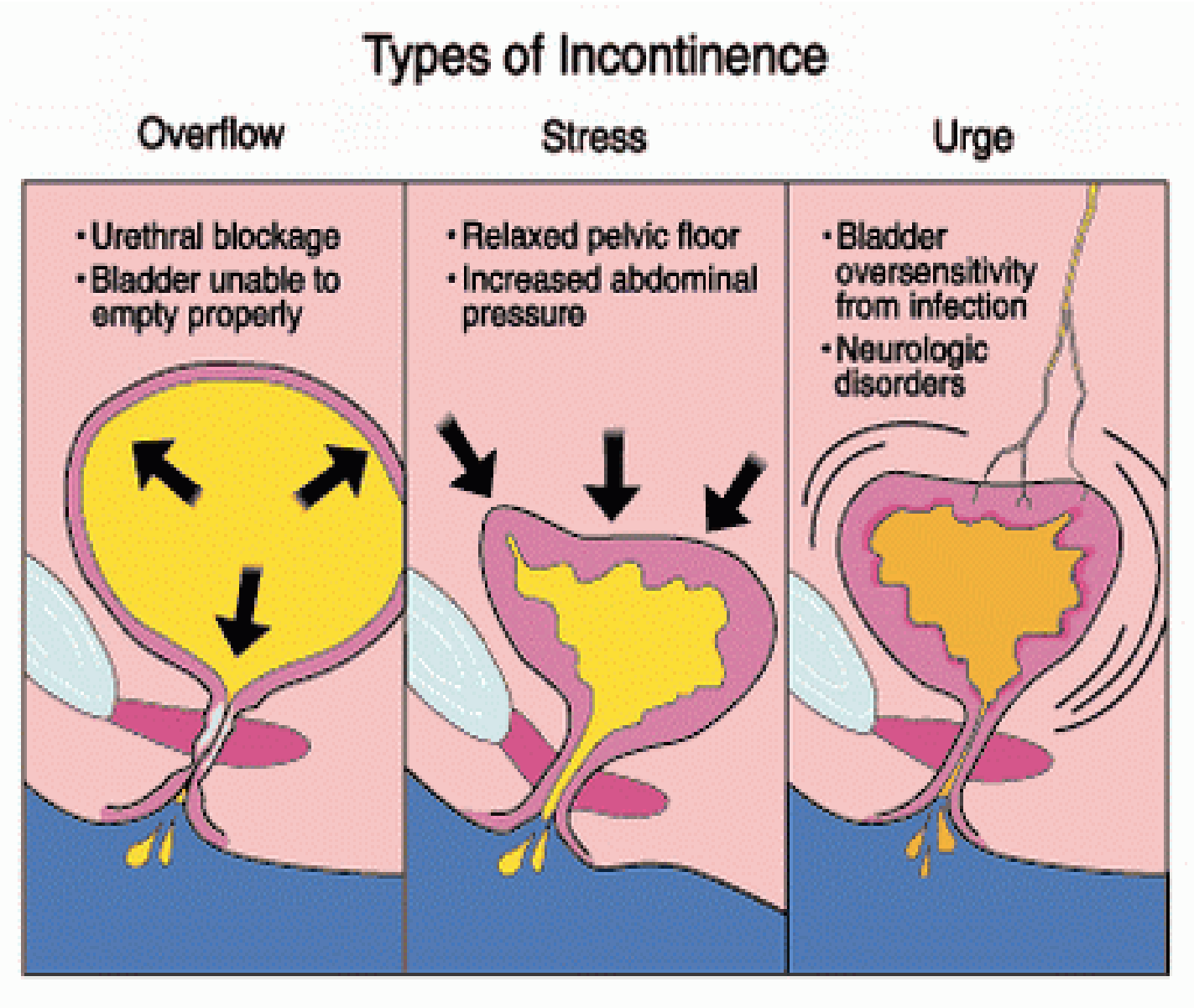
- Occurs due to detrusor muscle overactivity
  - Two subtypes
    - **Sensory** – result of local irritation, inflammation or infection within the bladder
    - **Neurologic** – caused by loss of cerebral inhibition of the detrusor muscle contractions

MIXED

- Prevalence increases with age with both stress and urge incontinence
- 1/3 of adults with incontinence have mixed

OVERFLOW

- Due to impaired detrusor muscle contractility
- Bladder outlet obstruction
- Both
- Common in men due to BPH


Types of Incontinence
Overflow
Stress
Urge
• Urethral blockage
• Bladder unable to empty properly
• Relaxed pelvic floor
• Increased abdominal pressure
• Bladder oversensitivity from infection
• Neurologic disorders

FUNCTIONAL

- “Toileting Difficulty”
- Caused by
  - Cognitive impairment
  - Functional
  - Mobility difficulties
- Prevalence is uncertain

Table 1. Types of Chronic Urinary Incontinence

Type	*Prevalence*	*Pathophysiology*	*Symptoms*	*History*	*Etiology*
Stress	24 to 45 percent in women older than 30 years	Sphincter weakness (urethral sphincter and/or pelvic floor weakness)	Loss of small amount of urine during physical activity or intra-abdominal pressure (coughing, sneezing jumping, lifting, exercise); can occur with minimal activity, such as walking or rising from a chair	Patient usually can predict which activities will cause leakage	Childbirth and obesity in women; may occur after prostatectomy in men
Urge	9 percent in women 40 to 44 years of age 31 percent in women older than 75 years 42 percent in men older than 75 years	Detrusor overactivity (uninhibited bladder contractions) caused by irritation within the bladder or loss of inhibitory neurologic control of bladder contractions	Loss of urine preceded by a sudden and severe desire to pass urine; patient typically loses urine on the way to the toilet Bladder contractions may also be stimulated by a change in body position (i.e., from supine to upright) or with sensory stimulation (e.g., running water, hand washing, cold weather, arriving at the front door)	Volume of urine loss is variable, ranging from minimal to flooding (if entire bladder volume is emptied) Frequency and nocturia are common Symptoms of urgency may also occur without urinary loss, which is known as overactive bladder	Bladder irritation caused by cystitis, prostatitis, atrophic vaginitis, bladder diverticuli, prior pelvic radiation therapy Loss of neurologic control caused by stroke, dementia, spinal cord injury, Parkinson disease
Mixed	20 to 30 percent of patients with chronic incontinence	Combination of stress and urge incontinence	Involuntary leakage associated with symptoms of urgency; loss of urine with exertion, effort, sneezing, or coughing	Patient should determine which symptom is predominant and most bothersome	Combination of the etiologies for stress and urge incontinence
Overflow (urinary retention)	5 percent of patients with chronic incontinence	Overdistention of the bladder caused by impaired detrusor contractility or bladder outlet obstruction; leads to urine leakage by overflow	Dribbling of urine, inability to empty bladder, urinary hesitancy, urine loss without a recognizable urge or sensation of fullness/pressure in lower abdomen	Does not usually occur unless bladder emptying is poor (postvoid residual volumes > 200 to 300 mL)	Anticholinergic medications, benign prostatic hyperplasia, pelvic organ prolapse, diabetes mellitus, multiple sclerosis, spinal cord injuries
Functional	Uncertain	Variable leakage of urine, usually caused by environmental or physical barriers to toileting	Caused by nongenitourinary factors, such as cognitive or physical impairments that result in the patient's inability to void independently	Impaired physical function (immobility) and/or impaired cognition Possible lower urinary tract deficits	Severe dementia, physical frailty or inability to ambulate, mental health disorder (e.g., depression)

Information from references 9, and 12 through 14.

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EVALUATION

TRANSIENT VS. CHRONIC

- Transient
  - Present less than 6 weeks
  - Look for reversible causes
  - DIAPPERS mneumonic

Differential diagnosis

- **D**elirium
- **I**nfection
- **A**trophic vaginitis
- **P**harmaceuticals
- **P**sychologic condition
- **E**xcessive urine output
- **R**educed mobility
- **S**tool impaction

Risk Factors

- Pregnancy – labor & vaginal delivery
- Hysterectomy
- Oral Estrogen
- Genetics & Family History
- BMI
- Dementia & loss of cognitive function
- Diabetes
- Smoking
- Caffeine
- Constipation/UTI

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Table 3. Common Medications and Substances That Can Cause Urinary Incontinence

Class	*Mechanism of effect*
Antihypertensives	
Alpha-adrenergic antagonists	Decrease sphincter tone, causing stress incontinence
Angiotensin-converting enzyme inhibitors	May increase coughing, causing stress incontinence
Calcium channel blockers	Relax the bladder, causing retention and overflow incontinence
Diuretics	High urine flow that leads to bladder contractions, causing urge incontinence
Pain relievers	
Cyclooxygenase-2 selective nonsteroidal anti-inflammatory drugs	Increase fluid retention, causing nocturnal diuresis and functional incontinence
Opioids	Relax the bladder, causing fecal impaction, sedation, retention, and overflow incontinence
Skeletal muscle relaxants	Inhibit bladder contractions, causing sedation, retention, and overflow incontinence
Psychotherapeutics	
Antidepressants, antiparkinsonian agents, antipsychotics	Inhibit bladder contractions, causing retention and overflow incontinence
Sedatives and hypnotics	Lead to sedation and impaired cognition, causing functional or overflow incontinence
Others	
Alcohol	Leads to diuretic effect and depressed central inhibition, causing urge incontinence, overflow incontinence, or both
Antihistamines, anticholinergics	Inhibit bladder contractions, causing sedation, retention, and overflow incontinence
Medications for urinary urgency	Inhibit bladder contractions, causing sedation, retention, and overflow incontinence
Thiazolidinediones	Increase fluid retention, causing nocturnal diuresis and functional incontinence

Information from references 6 and 13.

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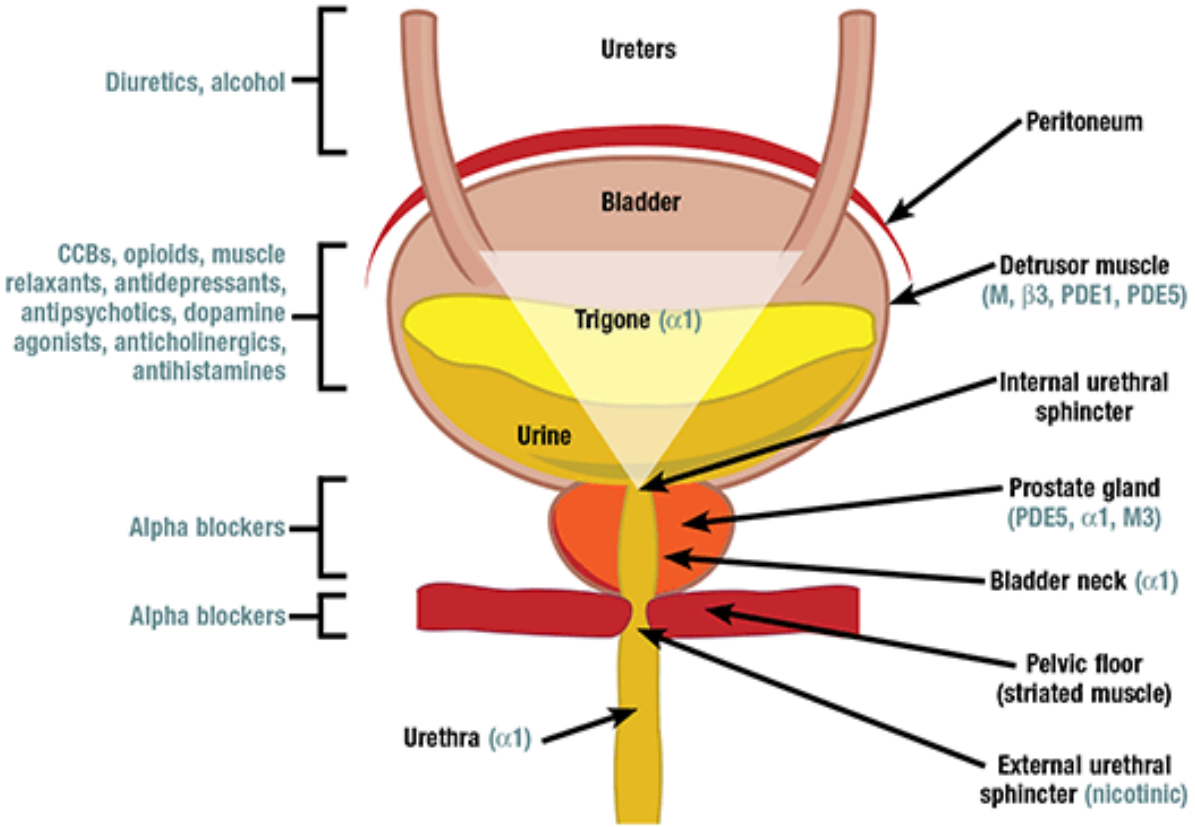
Figure 1. Schematic Sites of Action of Selected Drug Classes That Worsen UI



α: alpha-adrenergic; β: beta-adrenergic; CCB: calcium channel blocker; M: muscarinic; PDE: phosphodiesterase; UI: urinary incontinence.

Source: References 2, 9, 10. Original artwork by Mohammad A. Rattu, PharmD, CGP.

CHRONIC INCONTINENCE

- Use the 3 question tool to help determine type
- Assess for medical problems
  - Surgery – low back, GU, bowel/bladder
  - Neurologic conditions causing CNS dysfunction
  - Musculoskeletal conditions and impaired mobility
  - Cardiovascular disease – diuretic therapy
- Voiding Diary if history is unclear
- Physical Exam
  - External GU exam (pelvic organ prolapse, atrophy)
  - Prostate exam in men

1. During the past three months, have you leaked urine (even a small amount)?
   - ❑ Yes
   - ❑ No (questionnaire completed)

2. During the past three months, did you leak urine: *(check all that apply)*
   - ❑ A. When you were performing some physical activity, such as coughing, sneezing, lifting, or exercising?
   - ❑ 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 physical activity and without a sense of urgency?

3. During the past three months, did you leak urine *most often*: *(check only one)*
   - ❑ A. When you were performing some physical activity, such as coughing, sneezing, lifting, or exercising?
   - ❑ B. When you had the urge or feeling that you needed to empty your bladder, but you could not get to the toilet fast enough?
   - ❑ C. Without physical activity and without a sense of urgency?
   - ❑ D. About equally as often with physical activity as with a sense of urgency?

Definitions of type of urinary incontinence are based on responses to question 3:

Response to question 3	*Type of incontinence*
A. Most often with physical activity	Stress only or stress predominant
B. Most often with the urge to empty the bladder	Urge only or urge predominant
C. Without physical activity or sense of urgency	Other cause only or other cause predominant
D. About equally with physical activity and sense of urgency	Mixed

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COUGH STRESS TEST

- Most reliable clinical assessment for diagnosing stress incontinence
- Perform in office with patient in lithotomy position with full bladder
- Have patient separate labia
- Relax pelvic floor muscles then cough
- Repeat standing if no leakage within 5-15 seconds of coughing

EVALUATION

- Labs
  - Serum creatinine and urinalysis
- Postvoid Residual Volume (PVR)
  - Volume <50 ml negative
  - Volume 100-200 ml indeterminate
  - Volume > 200 ml suggestive of overflow
- Urodynamic testing
  - No benefit in uncomplicated stress and urge incontinence
  - Useful in drug refractory overactive bladder syndrome

DIAGNOSIS

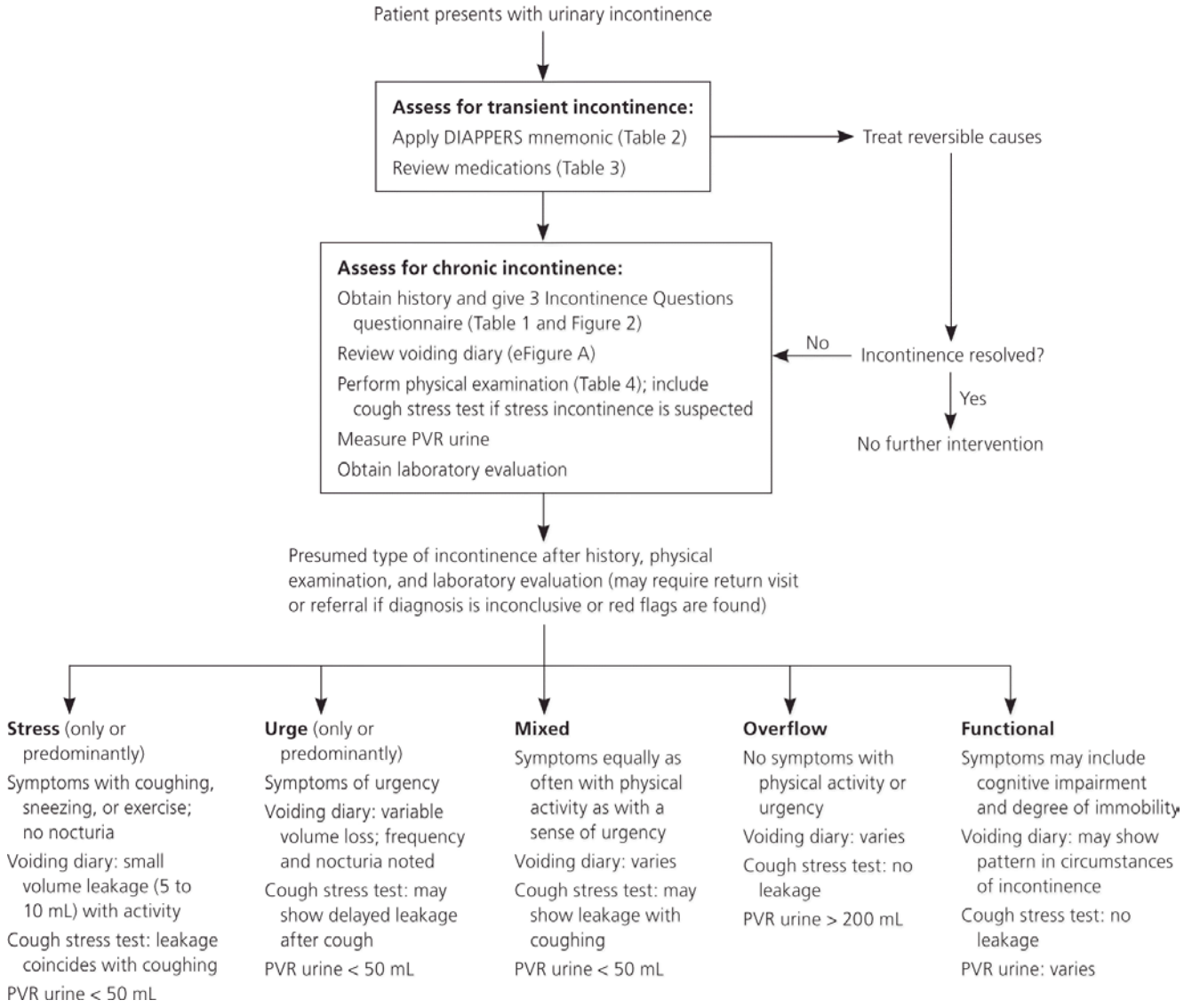

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Table 5. Indications for Urologic Referral

Incontinence associated with relapse or recurrent symptomatic urinary tract infections
Incontinence with new-onset neurologic symptoms, muscle weakness, or both
Marked prostate enlargement
Pelvic organ prolapsed past the introitus
Pelvic pain associated with incontinence
Persistent hematuria
Persistent proteinuria
Postvoid residual volume > 200 mL
Previous pelvic surgery or radiation
Uncertain diagnosis

Information from references 18 and 36.

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Can't stop
the flow

MANAGEMENT

FIRST THINGS FIRST

- Lifestyle changes
  - Limit fluid intake and caffeine
  - Timed voiding – goal every 2-3 hours
  - Treat constipation
  - Weight loss for BMI>25
- Pelvic floor muscle training
  - Kegel exercises 8 contractions tid

Drug treatments

Anticholinergic drugs

- Mainstay of treatment for urgency and overactive bladder syndrome
- Non selective - Oxybutynin, Tolterodine, Fesoterodine, Trospium
- Side effects
  - Constipation, impaired cognition, sedation & blurred vision
- Cannot use in **narrow angle glaucoma**
- **4-8 weeks** of use to determine optimal effect
- M2/M3 selective agents – reduce detrussor muscle overactivity
  - Darifenacin and Solifenacin

Mirabegron

- Used for overactive bladder syndrome
- Activates B3 adrenergic receptors and relaxes the bladder detrusor muscle with less adverse side effects from typical anticholinergics
- Can increase blood pressure
- Placebo controlled RCT found once daily dosing 100 mg had 1.6 fewer daily episodes of urinary incontinence from placebo and a baseline of 2.4 episodes daily

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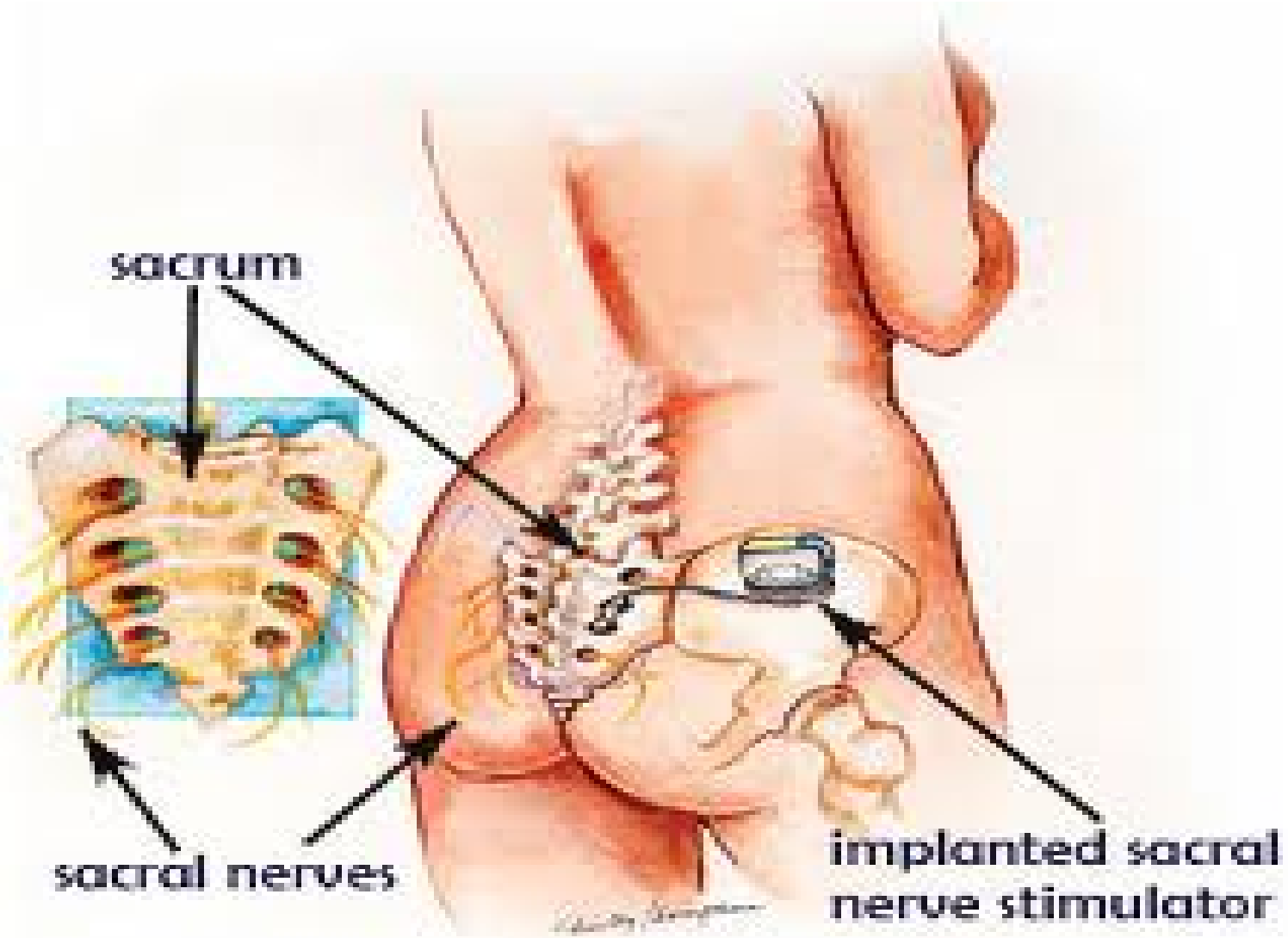
Treatment of drug refractory urge incontinence with minimally invasive techniques

- Failed 2 different anticholinergic drugs after 4 weeks each
- Intravesical Botulinum toxin approved by FDA in 2013
  - Risk of urinary retention requiring self catherization/UTI
- Sacral neuromodulation
  - Stimulation thru electrodes placed thru S3 nerve foramen
  - 67-80% patients achieve continence


sacrum
sacral nerves
implanted sacral
nerve stimulator

Treatment of drug refractory urge incontinence

- Posterior tibial nerve stimulation
  - 12 weekly visits about 30 minutes each
  - Peripherally stimulate the posterior tibial nerve behind medial malleolus through the S2-S4 nerves
  - RCT demonstrated 79.5% patients cured at 12 weeks
  - Maintenance therapy every 3 weeks

Treatment of stress incontinence

- Kegel exercises remain first line
  - 38% cured after 3 months
- Medications:
  - Alpha adrenergic agonists – pseudoephedrine & phenylephrine cause urethral constriction
  - Duloxetine – not FDA approved
- Electrical and magnetic stimulation of pelvic floor muscles
- Devices
  - Vaginal inserts compress bladder neck & urethra
  - Urethral plug – used during running

Invasive procedures for stress incontinence

- Radiofrequency denaturation – non surgical
  - Denatures collagen in bladder neck/proximal urethra
  - Cure rates 22-67%
- Tension free vaginal tape – sling around urethra
- Injection of bulking agents – transurethral
- Surgical options
  - Sling procedures – pubovaginal and midurethral
  - Urethropexy

TREATMENT OF OVERFLOW INCONTINENCE

- Relief of obstruction
- Intermittent vs. indwelling catheterization
- Pharmacologic
  - Alpha-adrenergic antagonists/blockers
- Surgical
  - Suprapubic catheter