REVIEW OF CAUSES, EVALUATION, AND TREATMENTS

URINARY INCONTINENCE 101
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Kevin E Miller, MD
Department of Obstetrics and Gynecology
University of Kansas School of Medicine- Wichita

URINARY INCONTINENCE
1 - 2 - 3 - 4

PICK A NUMBER
Urinary incontinence 103
Female Urinary Incontinence

Definition

- International Continence Society defines *urinary incontinence* as the involuntary loss of urine which is severe enough to be a social or hygienic problem, and which is objectively demonstrable.
Urinary Incontinence

Types

Stress incontinence
Urgency incontinence (overactive bladder)
Mixed incontinence
Overflow incontinence
Bypass of anatomic continence mechanism
Functional / Transient incontinence (DIAPPERS)
Female Urinary Incontinence

Overflow Incontinence (OI)

- Involuntary urine loss associated with an overdistended bladder caused by chronic urinary retention secondary to either:
  - **Bladder outlet obstruction** (mechanical)
  - **Impaired detrusor contractility** (bladder atony)
  - **Impaired sensation** (neurologic-autonomic or peripheral neuropathy)
  - **Drugs** - anticholinergics, Ca++ channel blockers, α, β agonists, radiation fibrosis
Female Urinary Incontinence
Bypass of anatomic continence mechanism

- Fistula
  - Vesicovaginal
  - Urethrovaginal
  - Vesicouterine
- Diverticulum- urethral
- Ectopic ureters
  - Urethra
  - Vagina
  - Cervix/uterus
- Epispadias (incomplete midline fusion of genitals)
  (less common and characterized by “continuous leakage”)
Female Urinary Incontinence

Transient/Reversible Causes

- Delirium/Dementia (prompted voiding)
- Infection (topical estrogen)
- Atrophy (topical estrogen)
- Pharmacology (psychotropics)
- Psychological (OCD, severe depression)
- Endocrine (glucose control, polydipsia)
- Restricted mobility (bedside commode)
- Stool impaction (colon laxatives, enemas)
Stress Urinary Incontinence (SUI)

- Involuntary loss of urine with increases in intra-abdominal pressure (cough, sneeze, lifting, running)
- Dx made when urine loss from urethra seen with valsalva
- Two causes of SUI
  - Hypermobility of urethrovvesicle junction
  - Intrinsic Sphincteric Deficiency (ISD)= impaired urethral function-intrinsically low pressure urethra
ISD
Intrinsic Sphincteric Deficiency

- Inability of urethra to occlude
- Causes: trauma, aging, atrophy, neuromuscular changes
- May occur without increases in intra-abdominal pressures
- MUCP < 20 cm H2O; VLPP < 50 cm H2O
A

INTRAPARTUM INJURY

- Levator Ani Muscle Tears
- Connective Tissue Breakage and Tears
- Pudendal/Pelvic Nerve Denervation

B

CHRONIC FACTORS:
- Denervation of Pudendal/Pelvic Nerves
- Aging
- Hypoestrogenic State

- Loss of Levator Ani Muscle Tone (active support loss)
- Loss of Intrinsic Urethral Sphincter Muscle Tone

- Connective Tissue Failure (passive support loss)
- Intrinsic Urethral Failure

STRESS URINARY INCONTINENCE
Urgency Urinary Incontinence (UUI)
Overactive Bladder Function

- Disorder of urine storage phase characterized by involuntary detrusor contractions (detrusor overactivity, unstable bladder)
- Characterized by urgency / frequency, small volume voids
- Bladder contracts spontaneously or with provocation during filling
- Neurologic disorders commonly associated with Neurogenic DO, detrusor sphincter dyssynergia-stroke, dementia, MS, brain tumor, Parkinson disease (neurogenic bladder)
OAB Terminology

- Urgency
- Frequency
- Nocturia
- Urgency Urinary Incontinence
- OAB Syndrome
OAB
Detrusor Overactivity

- **Neurogenic Detrusor Overactivity**
  - Associated with known neurologic disease
  - Detrusor hyperreflexia- old terminology

- **Idiopathic Detrusor Overactivity**
  - Most common type - 90%
  - No specific cause found
Idiopathic Detrusor Overactivity

- No specific cause (90% of OAB / DO)
- Non neurologic
- Behavioral (high volume intake, irritants, constipation)
- Obstruction of bladder outlet (severe POP)
- Aging
Mixed Incontinence (MUI)

- Stress and Urge together
- Larger volumes of urine loss and more episodes /week
- Incontinence continuum
  - 100% SUI ---------------- SUI/UUI ---------------- 100% UUI
REVIEW- The 3 most common and 3 less common types of incontinence are?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
Urinary Incontinence

Major types in the neurologically intact female

- Stress incontinence (SUI)
- Urgency incontinence (UUI)
- Mixed incontinence (MUI)

Overflow incontinence (OI)

Bypass of anatomic continence mechanism

Functional / Transient incontinence (DIAPPERS)
EVALUATION
INCONTINENCE EVALUATION
MINIMUM

1. H+P
2. URINALYSIS (UA)
3. POST VOID RESIDUAL VOLUME (PVRV)
AUA /SUFU GUIDELINES
If considering invasive surgical therapy

- Assess Post void residual volume (PVRV) – Expert opinion
- May perform multi-channel UDS in patients with stress incontinence (Grade C) - to confirm or refute dx, not to predict outcome
- Should assess urethral function
- If prolapse- perform stress testing with prolapse reduction
Strain angle/Q tip test for urethral hypermobility > 30°
Urinary Incontinence - Evaluation

- UA
  - Negative predictive value – 97% (neg dipstick reliably rules out infection)
  - Culture if positive or suspicious
Urinary Incontinence Evaluation

- Post-void residual volume
  - Normal <50 ml  Abnormal >200 ml
  - Measured by straight cath or bladder scan U/S immediately after void
Urinary Incontinence Evaluation -

- **Additional Tests**
  - Bladder diary
  - Simple cystometrogram
  - Multi-channel urodynamic studies
Voiding Diary (Bladder diary)

GIVES INFORMATION CONCERNING PATIENT’S VOIDING VOLUMES, HABITS, FLUID CONSUMPTION, FUNCTIONAL CAPACITY, LEAKAGE EPISODES, NOCTURIA, COGNITIVE STATUS.
Urinary Incontinence Evaluation

- Voiding diary
  - voided volumes (250 ml/void)
  - intake volume (1,500 ml/day)
  - frequency (6 X / day)
  - nocturia (1-3X)
  - # incontinence episodes / day
Urinary Incontinence-Evaluation
Urinary Diary

- **Time** | Incontinence
- 0710 arise urgent leaked
- 0800
- 0845
- 1030 urge
- 1220
- 1400
- 1545 urge leaked
- 1700
- 1800
- 2015
- 2100
- 2330 bed
- 0200 urge leaked
- 0430 14 voids/24 hr

- **Voided volume (ml)**
- 150
- 75
- 50
- 175
- 90
- 50
- 175
- 100
- 125
- 75
- 50
- 125
- 150
- 75

1,470 ml / 24 hr
Which patients should have complex urodynamic studies?

- Mixed incontinence
- Severe POP beyond hymen
- Elevated PVR volume
- Urge incontinence-refractory to conservation Rx
- Failed previous surgery for incontinence
- Suspicion of ISD (fixed urethra, +EBST)
- Voiding dysfunction
- Continuous incontinence/Severe incontinence
- Neurologic disorders
- Decreased bladder capacity
- Bladder pain syndrome with urge frequency refractory to Rx
- History of pelvic radiation
- Nocturnal enuresis refractory to therapy
REVIEW Q. A 28 yo woman complains of having to void every 1-2 hours during the day (voiding diary confirms 75ml average voided volume) with leakage from sudden urge and with running and exercise. She has a positive supine stress test with 300ml in the bladder and a PVRV of 15 ml. Her diagnosis is:

- A. urgency incontinence
- B. stress incontinence
- C. overflow incontinence
- D. mixed incontinence
- E. athletes incontinence
REVIEW Q. A surgical procedure is being contemplated for a 55yo woman with multiple sclerosis who had previous “bladder lift”. Which of the following is the least important part of the evaluation.

- A. History - ascertain what her previous operation was
- B. Urinalysis or urine culture
- C. Post void residual volume (rule out urinary retention)
- D. Physical exam - cough stress test and evaluate urethra
- E. Multichannel urodynamic evaluation
- F. Tampon test with methylene blue dye instillation into bladder (rule out VVF)
Non Surgical

INCONTINENCE THERAPY
Non surgical therapy: Primary options

**STRESS INCONTINENCE**
- PFM Exercises
- Vaginal devices
- Bladder training
- Weight loss

**URGENCY INCONTINENCE**
- Anti-muscarinic therapy
- Behavioral therapy
  - Timed voiding
  - Urge suppression
- Physical therapy
Pessary for SUI

- Requires willing, motivated patient
- Is helpful therapy in 25%
- Requires ongoing maintenance
When Pessaries don’t work out

Possible alternative uses

Stylish too!
3 Surgical therapies for stress urinary incontinence

- 1. Slings (synthetic MUS, auto, allo/xeno PVS)
- 2. retropubic urethropexy
- 3. urethral bulking injections
Retro-pubic Urethropexy / Colposuspension
Marshall-Marchetti-Krantz 1949
Burch 1961

- Permanent suture
- 2-3 per side
- Double purchase into full thickness of muscularis of anterior vaginal wall (pubocervical fascia)
- MMK-attach to cartilaginous periosteum of median raphe
- Burch- attach to Cooper’s ligament
- Tanagho modification 1976
- Routine obliteration of cul de sac recommended to reduce enterocele formation 7.6% (Burch 1967)- unconfirmed if this reduces recurrent prolapse
TVT (tension free vaginal tape) & TOT (trans-obturator TVT)
What is the difference?

Trocar passage through retro-pubic space

Theoretically less risk of bladder, nerve, vascular, and intra-abdominal viscera injury with trocar passage
Periurethral Bulking

A

Scope
Collagen injection needle
Open UVJ

B

Scope
Collagen injection needle
Partial closure of UVJ

Bladder neck
Urethral mucosa bulging
Collagen injection needle
Urethroscope
Therapies for stress incontinence

SUMMARY

- MUS is most effective treatment (80-85%)
- Pessary helpful in 25%- ½ will go to surg
- Pelvic floor muscle training is effective- if sustained
- Medications are NOT effective
- Urethral bulking injections- for severe refractory ISD
Overactive Bladder Therapy

- **First**
  1. Lifestyle modification / Behavioral
  2. Pelvic floor muscle exercises/biofeedback/ FES
  3. Medications

- **More invasive**
  1. Sacral nerve stimulation (InterStim)
  2. Intravesical injections (Botox)
  3. Radical surgery (bladder augmentation) - rare
Lifestyle / Behavioral Modifications

- Urge suppression techniques
- Timed voiding
- Fluid management
- Diuretic management
- Weight loss
Non surgical therapy for incontinence
Pelvic floor muscle training (PFMT)

- **For Urgency Urinary Incontinence (UUI)**
  - PFM contractions inhibit detrusor contractions
  - Improves UUI in combination with behavioral therapies
1/5 patients will fail conservative therapy for OAB

- Sacral nerve stimulation = sacral neuromodulation = InterStim®
- Is an electrode placed through the 3rd sacral foramen (with or without fluoroscopy)
- With a test phase of 3-14 days before long-term implant
- Success defined as > 50% improvement in urgency/urge incontinence episodes or <8 voids per day.
Risks:
- urinary tract infection 20-40%
- urinary retention 5-30% (clean self cath)

Repeat injections (9 mo)
• Office procedure
• Topical bladder anesthetic
• 100–300 units
• 10 units/mL
• 10–30 injection sites
• Trigone sparing to prevent reflux
• Adding methylene blue allows for identification of previously injected sites
A 85 yo woman who complains of always leaking urine with minimal exertion after a synthetic “mini sling”, has an immobile urethra had UDS with stable detrusor to fill and VLPPs of < 60 cm H2o and UPPs < 20 cm H2o. Her diagnosis and best treatment is:

A. Mixed incontinence: retropubic MUS
B. Neurogenic bladder: Sacral neuromodulation (InterStim)
C. Stress incontinence: retropubic urethropexy
D. Urgency incontinence: intravesicle Botox injection
E. Intrinsic Sphincteric Deficiency (ISD): Urethral bulking
F. Vesico-vaginal fistula secondary to sling: pessary
REVIEW- Treatments

- Effective treatments for Stress Urinary Incontinence (SUI) include.
  - A. Vaginal pessary
  - B. Retropubic urethropexy (MMK, Burch)
  - C. Synthetic mid-urethral sling
  - D. Anterior colporrhaphy (cystocele repair)
  - E. A, B, and C
  - F. All of the above
The end
### Frequency/Volume Chart

<table>
<thead>
<tr>
<th>Time</th>
<th>Intake</th>
<th>Output</th>
<th>Symptoms</th>
<th>Time</th>
<th>Intake</th>
<th>Output</th>
<th>Symptoms</th>
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<tbody>
<tr>
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<td>500 cc</td>
<td>880 cc</td>
<td>Urgo, incontinence</td>
<td>6:20</td>
<td>100 cc</td>
<td>150 cc</td>
<td>Urgo, leak</td>
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<tr>
<td>7:20</td>
<td>300 cc</td>
<td>400 cc</td>
<td></td>
<td>6:30</td>
<td>500 cc</td>
<td>700 cc</td>
<td>Urgo</td>
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<tr>
<td>8:30</td>
<td>200 cc</td>
<td>350 cc</td>
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<td>1750 cc</td>
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<tr>
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<td>600 cc</td>
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<td>Urgo</td>
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<td>100 cc</td>
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</tbody>
</table>

| TOTAL  | > 8,000 | > 9,000 |                | TOTAL  | 7,000  | 7,000  |                |

- **Bedtime**

**Figure 3.5**: Frequency/volume chart from a patient with excessive fluid intake resulting in excessive urine output.

Nocturnal enuresis may be further subdivided into primary and secondary.
Non surgical therapy for incontinence

Pelvic floor muscle training (PFMT)

- For STRESS INCONTINENCE
  - Increased continence rates and improved UI
  - PFMT combined with bladder training
    - Increased continence rates and improved MUI
  - PFMT with biofeedback improved UI
Non surgical therapy
PFMT +/- Biofeedback

- No differences in clinical outcomes
- No consistent differences in continence
- No difference in QOL