STRESS URINARY INCONTINENCE

FLAME LECTURE: 176

BURNS / TABIT / HOLDT 3.7.17

LEARNING OBJECTIVES

- Discuss etiology and risk factors for stress incontinence
- Describe the workup for stress urinary incontinence
- Describe management of stress urinary incontinence
- Prerequisites:
  - NONE
- See also – for closely related topics
  - FLAME LECTURE 174 – Urogyn H&P
  - FLAME LECTURE 175 – Urge Urinary Incontinence
  - FLAME LECTURE 177 – Urinary Retention

ETIOLOGY

- Stress Incontinence (SUI) is the involuntary leakage of urine which occurs when intra-abdominal pressure increases (ex. laughing, coughing, sneezing, exertion)
- Causes:
  - Urethral hypermobility: insufficient support of pelvic floor musculature and vaginal connective tissue, leading to the inability of the urethra to completely close against the anterior vaginal wall during increased intra-abdominal pressure
  - Intrinsic sphincter deficiency: loss of urethral tone that normally keeps the urethra closed; seen in neuromuscular damage
- Often associated with pelvic organ prolapse

RISK FACTORS

- Conditions causing pelvic relaxation:
  - Vaginal childbirth
  - Aging
  - Genetic factors
- Conditions causing chronic increases in intra-abdominal pressure:
  - Constipation
  - Chronic coughing from lung disease, smoking
  - Chronic heavy lifting
  - Obesity (worsens but does not cause incontinence)
- Conditions that weaken the urethral closing mechanism:
  - Estrogen deficiency
  - Scarring
  - Denervation
  - Medications

PHYSIOLOGY

Bladder Muscle Function

- Detrusor Muscle: smooth muscle layer of bladder. Relaxes to allow bladder filling and contracts during urination
- Sphincter: controls bladder outlet (internal sphincter is under autonomic control, external sphincter is under somatic control)
- Levator ani: voluntary muscle of pelvic floor that assists in urine retention

PHYSIOLOGY

Autonomic Nervous System

- Sympathetic firing – Bladder filling
  - *Hypogastric n.* (T10-L2) inhibits detrusor muscle, relaxing bladder
  - *Pudendal n.* contracts sphincter, preventing bladder outflow
- Parasympathetic firing – Bladder contraction
  - Bladder filling causes stretch receptors to send afferent signals to brain that create parasympathetic outflow
  - *Pelvic splanchnic nn.* are the parasympathetic innervations, contract detrusor muscle – *muscarinic receptor*

PHYSIOLOGY – AT REST

- Intraurethral pressure exceeds the intravesical pressure.
- Internal sphincter:
  - Continous contraction. Primary mechanism.
- The external sphincter:
  - Provides 50% of urethral resistence, 2nd line of defence.
- Submucosal vasculature of the urethra
  - Fills with blood → increase intraurethral pressure → prevents involuntary loss of urine. This filling system is known as *mucosal coaptation* and is estrogen sensitive.

HISTORY

- **During the last 3 months, did you leak urine (*check all that apply*)**
  - When you were performing some physical activity (coughing, sneezing, lifting, exercise)?
  - 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?
  - Without physical activity and without a sense of urgency?
- **During the last 3 months, did you leak urine *most often* (*choose only one*):**
  - When you were performing some physical activity (coughing, sneezing, lifting, exercise)? (**Stress incontinence)**
  - 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? (**Urge Incontinence)**
  - Without physical activity and without a sense of urgency? (**Incontinence of other predominant cause)**
  - About equally as often with physical activity as with a sense of urgency? (**Mixed incontinence)**

HISTORY

- Associated symptoms
  - Dysuria, nocturia, hematuria, pelvic pain, fever (if present consider UTI as source of incontinence)
  - Neurologic symptoms
- Impact and quality of life
  - Which symptoms are most bothersome? How have the symptoms changed since the last visit?

PHYSICAL EXAM / LABS

- Speculum Exam
  - Look for vaginal atrophy, pelvic masses, anterior vaginal wall prolapse (assess using the POP-Q: Pelvic Organ Prolapse Qualification System; see FLAME 178)
- Bladder Stress Test
  - While standing, patient with full bladder is asked to valsalva while examiner watches for leakage
- Post-void Residual
  - Calculating the amount of urine still in the bladder after voiding is useful in evaluating for urinary retention
    - A PVR < 50ml is normal; > 200mL abnormal
- Q-tip Urethral Mobility Study
  - Cotton swab/Q-tip placed in urethra and observed for movement with valsalva,
    - Normal rotation < 30° change with valsalva vs. without, hypermobility is greater increase in mobility with valsalva
- UA/UCx
  - Useful in ruling out UTI

MANAGEMENT - CONSERVATIVE

Lifestyle Modifications

- Fluid intake regulation
- Weight loss
- Increase fiber - relieve constipation which can increase intra-abdominal pressure
- Pelvic floor exercises (Kegel exercises) – 10 second contractions of muscles that are used to prevent urination
  - This can be combined with biofeedback exercises or electrical stimulation

Medical therapy

- Increase urethral sphincter tone and enhance urethral closure
  - Estrogen: increase urethral tone by enhancing mucosal coaptation
  - Imipramine (TCA)

MANAGEMENT - CONSERVATIVE

Pessaries

- Devices that can be inserted into the vagina to improve urethral support and functional urethral length
- Support-type pessaries are most commonly used for stress urinary incontinence

MANAGEMENT - SURGICAL

Injectable urethral bulking agents

- Injected into the urethral wall to narrow urinary outlet
- Two commonly used types:
  - Coaptite - a synthetic calcium hydroxyapatite
  - Macroplastique - a silicone-based gel
- Pros: performed in the clinic; less invasive than other surgical options, thus good for patients who are unfit for surgery
- Cons: less effective than slings; absorbed by the body over time, requiring repeat injections every 18-24 months

MANAGEMENT - SURGICAL

Midurethral Sling

- A polypropylene tape, about 1cm in width, is implanted to offer support under the urethra. The tape cradles the urethra and is held in place within the patient's native tissue. At rest, it is tension-free, but upon intra-abdominal pressure, it provides resistance.
- Performed when patient has symptomatic SUI and either declines or has failed conservative treatment
- Other surgical options, such as BURCH (retropublic urethropexy) and bladder neck slings have fallen out of favor in place of midurethral slings, due to shorter operation and hospital stay and less risk of post-operative complications, with the same effectiveness

IMPORTANT LINKS / REFERENCES

1. Pelvic Floor Distress Inventory
2. Pelvic Floor Impact Questionnaire
3. AUA Guidelines – Guideline for the Surgical Management of Female Stress Urinary Incontinence
4. UpToDate
5. AUA Guidelines - GUIDELINE FOR THE SURGICAL MANAGEMENT OF FEMALE STRESS URINARY INCONTINENCE: UPDATE (2009)
6. Ann Intern Med. 2006;144(10):715
7. NEJM 1985;313:800