

Introduction

- Underactive bladder (UAB) is understudied and associated with poor quality of life with unresolved symptoms.
- There is no consensus on the definition of UAB, but it is characterized by symptoms of hesitancy, slow/intermittent stream, and sensation of incomplete emptying.

Objectives

Primary

- To assess the effect of electrical stimulation on bothersome urinary symptoms and bladder emptying.

Secondary

- To determine bladder and urethral sensory nerve function in women with underactive bladder.
- To assess the effect of intravesical stimulation on cystometric volumes.
- To assess the effect of intraurethral stimulation on detrusor contraction strength and duration.

Aims and Hypotheses

Sensory Nerve Function

- Women will have decreased sensitivity to electrical stimulation compared to normative data in asymptomatic women.

Intervention

- Intravesical electrical stimulation will decrease cystometric volume endpoints, increase emptying efficiency, and decrease bothersome symptoms.
- Intraurethral electrical stimulation will increase contraction strength and duration, increase emptying efficiency, and decrease bothersome symptoms.

Eligibility Criteria

Inclusion Criteria

Meet 2 of the 3:

- Self-reported poor sensation during filling or emptying
 - Q: In the past 7 days, where did you feel sensations when you felt you needed to urinate?
A: “No” response to bladder area
 - Q: In the past 7 days, how often did you have no sensation of urine flow while you were urinating?
A: “Most of the time” or “Every time” response
 - Q: In the past 7 days, how often did you feel that your bladder was not completely empty after urination?
A: “Most of the time” or “Every time” response
- Self-reported bothersome symptoms
 - Q: In the past 7 days, how satisfied were you with your bladder function?
A: “Not at all satisfied” or “Somewhat satisfied” response
 - Q: In the past 7 days, how bothered were you by urinary symptoms?
A: “Very bothered” or “Extremely bothered” response

- Clinic uroflowmetry voiding efficiency (VV / VV + PVR) < 80% (VV + PVR must be > 150ml)

Exclusion Criteria

- Preexisting neurological impairment (e.g., SCI, MS, Guillain-Barre, cauda equina syndrome, cerebrovascular accident, Parkinson’s disease, TBI)
- Functional obstruction demonstrated by elevated pelvic floor activity on EMG during UDS or high tone pelvic floor on clinical exam
- Surgical procedures to increase bladder capacity (e.g., augmentation cystoplasty)
- Active urinary tract infection

Methods

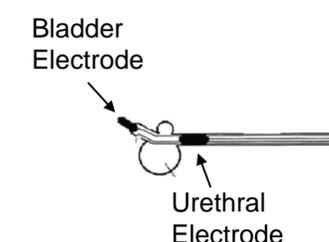
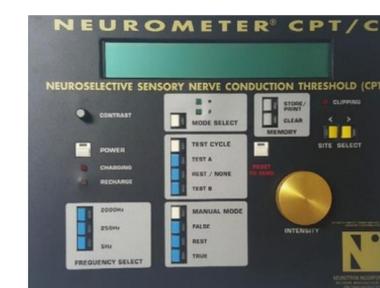
Symptom Questionnaire

Symptom Index (29) instrument providing patient-reported outcome measures to assess urinary symptoms.



Sensory Nerve Function

Current perception threshold (CPT) testing delivers electrical stimulation at varying amplitudes and frequencies to quantify sensory nerve function.



Intervention

- Intravesical stimulation
 - ↑ bladder CPT or “first desire to void” > 275ml
 - 20 Hz, 80% of tolerable intensity
 - 30-60 minute session
- Intraurethral stimulation
 - ↑ urethral CPT or baseline detrusor underactivity
 - 10 Hz, 80% of tolerable intensity
 - Stimulate at “strong desire to void”



Conclusions

- Studies will determine novel pathological CPT reference values to guide tissue specific intervention.
- Studies will improve patient selection and establish an individualized approach to neuromodulation in women with UAB.