Interstitial Cystitis and Chronic Pelvic Pain: Case report and search for relief

Chad Baxter, MD
Pelvic Medicine and Reconstructive Surgery
Department of Urology
David Geffen School of Medicine at UCLA
Los Angeles, California
Case of Refractory IC

- 43 year old woman with 4 year history of...
  - Urinary frequency every 20 – 30 minutes, q1-2hrs at night
  - Pain with increasingly full bladder
  - Intermittent dyspareunia
  - No anatomic abnormality (urethral diverticulum, pelvic organ prolapse, pelvic mass, etc.)
  - No history of infection (HPV, STD, UTI)
  - Cystoscopic evaluation normal
  - Urodynamics reveal sensory urgency, low capacity, no suggestion of neuropathology
Case Study: Refractory IC

- Symptoms not alleviated by…
  - Diet modification
  - Fluid and caffeine restriction
  - Physical therapy with biofeedback
  - Anticholinergic therapy
  - Amitriptylene, gabapentin, Elmiron
  - Intravesical anesthetics
  - Narcotics
  - Intravesical Botox
  - Cystoscopy with hydrodistention
Defining the target:

- Interstitial Cystitis (IC) and Chronic Pelvic Pain (CPP) are poorly defined conditions.
- Estimated prevalence of 0.5 to 1.0%.
- Typically present with:
  - Poorly localized, but generally suprapubic pain.
  - Increased pain with bladder filling.
  - Urinary urgency, frequency.
  - No identifiable etiology.
- Refractory to treatments, including cystectomy with urinary diversion.
- Significantly diminished quality of life.
Etiologic Theories

- Primary bladder injury
  - Increased urothelial permeability
  - Increased inflammatory mediators
  - Upregulation of neural pain pathway
  - Increased CNS sympathetic activity
  - Dysregulation of HPA axis
  - Persistent pain beyond presence of inciting agent
Etiologic Theories

- Normal afferent input to CNS, no bladder pathology

- Primary sensitization of central pathways
  - Emotional distress, prior trauma, other medical disease, etc.
  - Normal pelvic sensation misinterpreted as aberrant and painful (allodynia)
  - Evidence for central hyperresponsiveness to visceral related threat in IC patients.

Creation of rat model

- Water avoidance distressing of rats
- Pre and post-distress urodynamics
  - Increased micturition frequency
  - Decreased latency to void
  - Decreased voided volume

- Histology
  - Increased bladder vascularity in stressed animals
  - Decreased brain-derived neurotrophic factor (BDNF) expression

- This novel stress model is the first non-invasive method to stimulate urinary frequency and urgency
Intervention

- Etiology remains elusive and interventions empiric and ineffective

- Similar to other chronic pain conditions, allopathic treatment targets the end-organ and dysregulated nervous system

- Patients remain dissatisfied with treatment and seek alternatives

- Physicians frustrated by lack of efficacious treatment, exhausting patient interactions
**PROCAIM**

- UCLA School of Public Health and UCLA Center for Neurovisceral Sciences and Women’s Health database:

  People Reported Outcomes of Complimentary, Alternative, and Integrative Medicine (PROCAIM)

- Patient recruitment
  - Alternative care providers
  - Internet support groups and society web-sites
  - Craig’s List, major newsprint outlets, etc.

- Access PROCAIM website, complete on-line validated questionnaires
  [www.procaim.org](http://www.procaim.org)
PROCAIM and IC/CPP Patients

- Invited to analyze 275 patients with IC/CPP
- Treated by
  - Prescription, OTC
  - Allopathic
  - Reiki
  - Yoga
  - Frequency Specific Microcurrent
  - Massage
  - PT
  - Chiropractic
  - Meditation
  - Acupuncture
  - Herbalist
  - Psychology
  - Psychiatry
  - Homeopathy
  - Ayurvedic
PROCAIM and IC/CPP Patients

- Completed treatment history, Early Trauma Inventory at enrollment

- Completed validated surveys at enrollment and q3months:
  - Health Survey SF-36
  - Patient Health Questionnaire
  - Hospital Anxiety and Depression
  - Perceived Stress Scale
  - Coping Strategies/Catastrophizing
  - Brief Pain Inventory
PROCAIM and IC/CPP Patients

- Enrollment and analysis ongoing
- No clear beneficial treatment for IC/CPP
- Database an inadequate tool for this analysis
  - Convenience sample
  - Patient-reported diagnoses
  - No confirmatory interaction with patients
  - Not significantly powered to answer questions of efficacy

- Despite limitations…
  - Early trauma increases symptom severity and diminishes quality of life in IC and CPP patients

- Excellent medium for honing skills of statistical analysis!
Case Study: Refractory IC

- Neuromodulation (NMS) successfully used for chronic pain conditions…
  - Migraines, back pain, idiopathic angina pectoris
- NMS via 3rd sacral foramina (S3) efficacious for refractory urinary urgency and refractory urinary retention (mechanism unknown)
- Surreptitiously found S3 NMS to ameliorate some IC/CPP symptoms


Case Study: Refractory IC

- Traditional placement of unilateral NMS via S3 foramen.

- Indicated for refractory urgency/frequency syndromes and idiopathic urinary retention.
Novel caudal neuromodulation technique for IC/CPP

- Devised method of NMS overlying S2-S4 nerve roots bilaterally.

- **Rationale:**
  - Pain transmitted via multiple spinal levels
  - Pain transmitted via unmyelinated C-fibers, exacerbated via upregulation of these fibers.
  - Does not address additional recruitment of sympathetic fibers in chronic pain (e.g. hypogastric plexus)
Novel caudal neuromodulation technique for IC/CPP

Rationale (continued)

- Inability to capture dysfunctional pain foci in unilateral, focal therapy
- Modulation of several spinal levels likely to more effectively capture aberrant signaling
- Each lead independently programmable
- Bilateral leads allows for crossover electrical fields, bipolar stimulation, or unilateral as desired
- May expand and contract electrical field, decrease motor and sensory side effects
- Still cannot capture hypogastric plexus
Early Outcomes of Caudal Neuromodulation

- 23 consecutive patients (16 female, 7 male)
- Average f/u 15 months (6 to 32)
- Average age 46.3
- All refractory cases, exhausted pain management services
- 57% on daily narcotics

Early Outcomes of Caudal Neuromodulation

- Validated outcomes questionnaires:
  - IC Symptom Index (ICSI)  Improved 35% (p=0.005)
  - IC Problem Index (ICPI)  Improved 38% (p=0.007)
  - Urogenital Distress Inventory (UCI-6)  Improved 26% (p=0.05)
  - RAND Health Survey SF-36  No significant change
  - Visual analog pain scale  Improved 40% (p=0.04)
Early Outcomes of Caudal Neuromodulation

- 5 of 23 devices removed
  - 1 for infection
  - 4 for loss of efficacy

- Significant, durable effect in 18 of 23 (78%) and all off of narcotics

- Now performed more than 75 caudal NMS procedures

- Preparing long-term f/u to assess efficacy, durability, plasticity of neural response, etc.
Case of Refractory IC

- 43 year old woman with 4 year history of...
  - Urinary frequency was every 20 – 30 minutes, now q3-4 hours
  - Resolution of pain with bladder filling
  - Required post-operative re-programming 3 times
  - Will require battery change in approximately 6-8 years (outpatient surgery)
Future of Caudal Neuromodulation

- Randomize to unilateral v. bilateral stimulation
- Randomize to intermittent or continuous stim.
- Obtain postoperative video urodynamics ($)

Thank you

Chad Baxter, MD
Pelvic Medicine and Reconstructive Surgery
Department of Urology
David Geffen School of Medicine at UCLA
Los Angeles, California