Partner Veterinary
EMERGENCY & SPECIALTY CENTER

Urinary Incontinence

Mary Lester, DVM, DACVIM (SAIM)

November 8, 2026



Outline

- **Background**
  - Lower urinary tract anatomy
  - Physiology of voiding and storage
  - Role of pattern recognition
- **Pathophysiology of non-neurogenic incontinence**
  - Female and male dogs
  - Cats are different!
- **New therapeutic options at Partner**

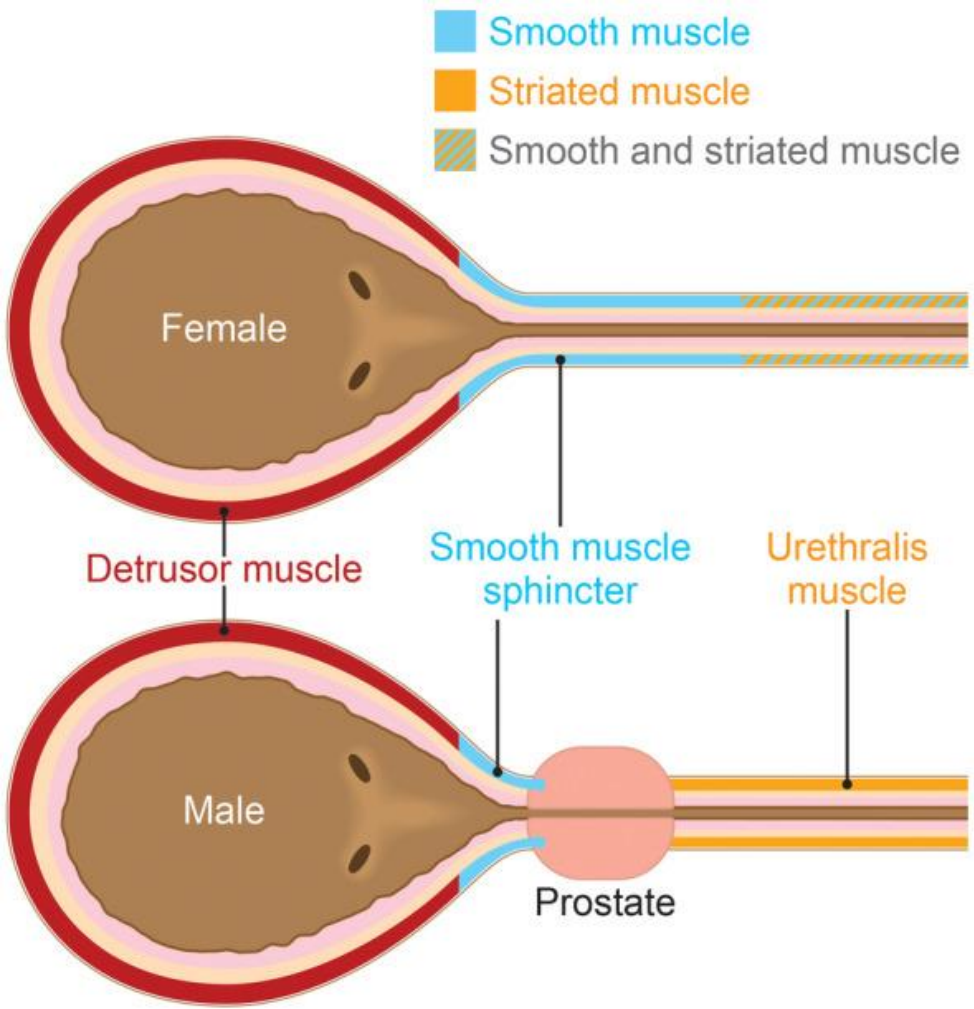


Background



LUT Anatomy

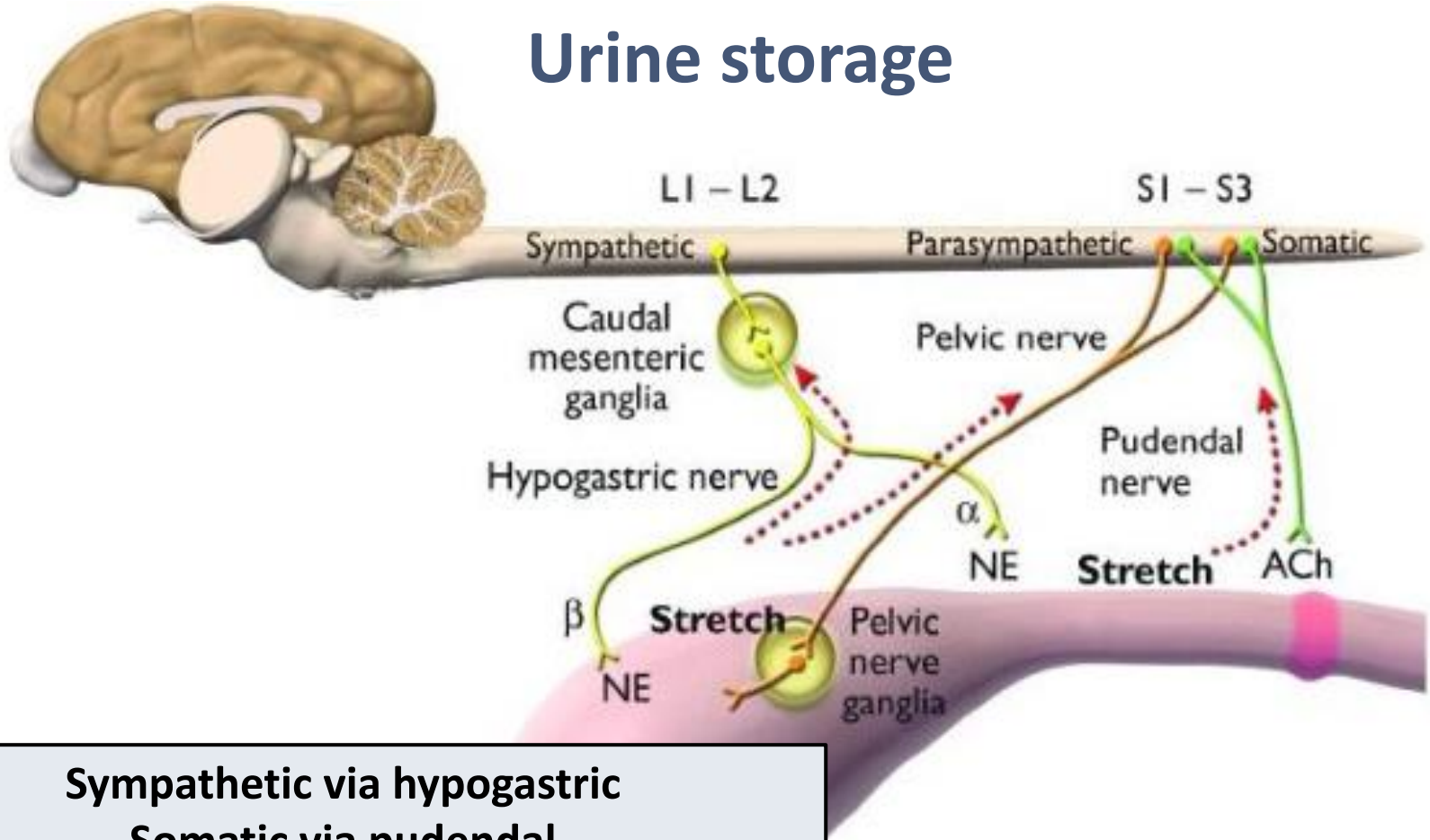
- Female urethral anatomy
  - Shorter urethra
  - Wider lumen
  - Intrapelvic bladder neck
  - Higher proportion of collagen to muscle
- Male urethral anatomy
  - Longer urethra
  - More extensive periurethral support
  - Sphincter function of striated muscle (50-70% of wall)



Physiology of Micturition

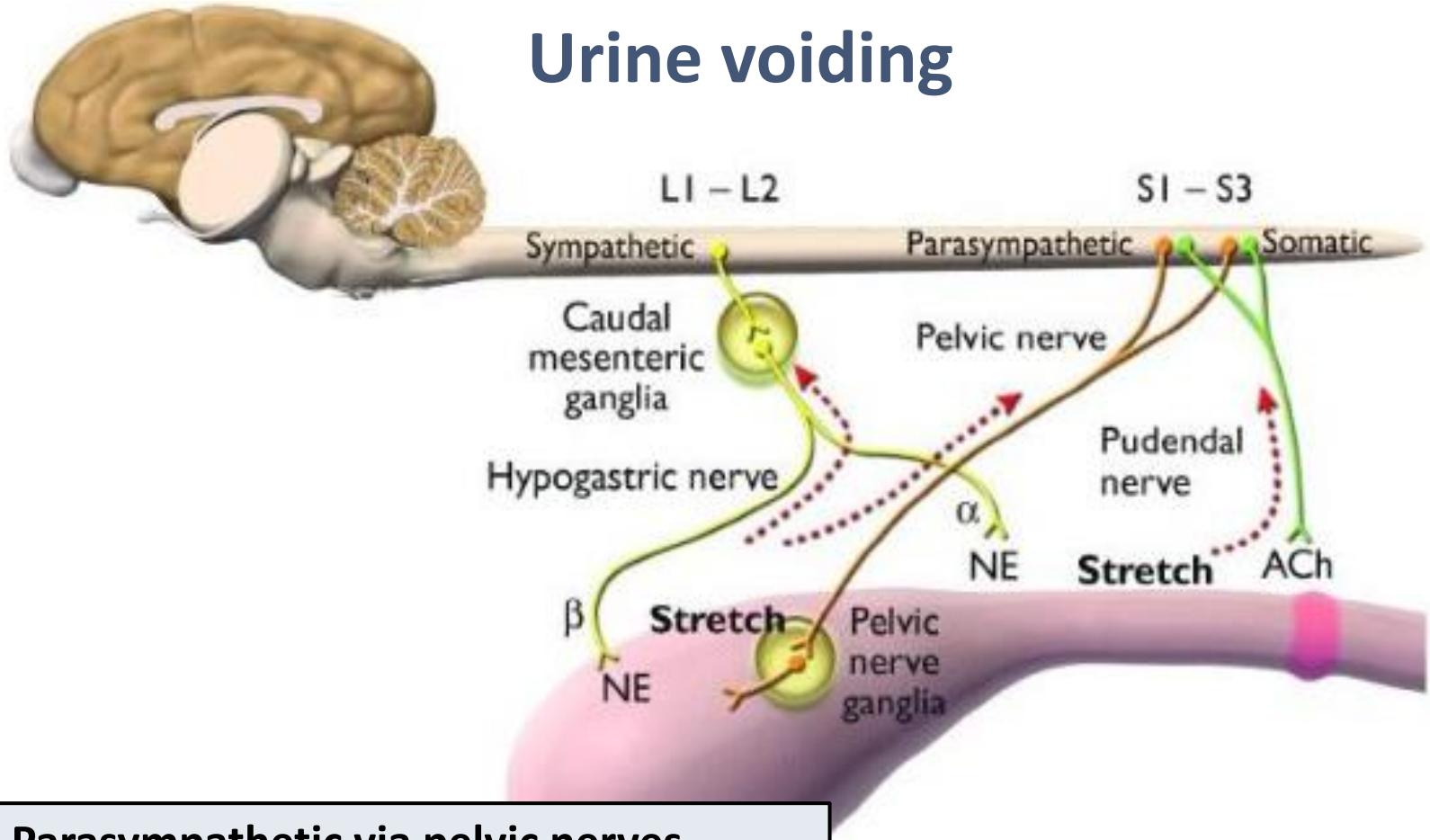
- Normal micturition depends on coordinated function of:
  - Bladder wall (detrusor)
  - Bladder neck/proximal urethra
  - Urethral smooth and striated muscle
  - Peripheral and central nervous systems
- **Urinary incontinence can reflect either**
  - Storage dysfunction
  - Voiding dysfunction

Urine storage



Sympathetic via hypogastric
Somatic via pudendal
Central via Pontine Storage Centers

Urine voiding



Parasympathetic via pelvic nerves
Central via Pontine Storage Centers

Urinary Incontinence

Storage disorder

- Urethral sphincter mechanism incompetence (USMI)
- Ectopic ureters (EU)
- Detrusor instability

Voiding disorder

- Functional outflow obstruction (FOO)
- Mechanical outflow obstruction (MOO)

Diagnostic approach to canine incontinence

Feature	Storage Disorder	Voiding Disorder
Bladder size	Usually normal or small	Often large/distended
Urine stream	Usually normal	Often weak, intermittent, prolonged
Residual urine	Minimal	Increased
Leakage pattern	Passive leakage from relatively normal bladder volume	Overflow leakage from overdistended bladder
Typical owner complaint	"Leaks while sleeping"	"Dribbles urine"
Urination frequency	May be normal or increased	Often increased attempts
Post-void residual volume	Normal	Elevated
Response to increasing urethral tone	Often improves	May worsen

History is important!

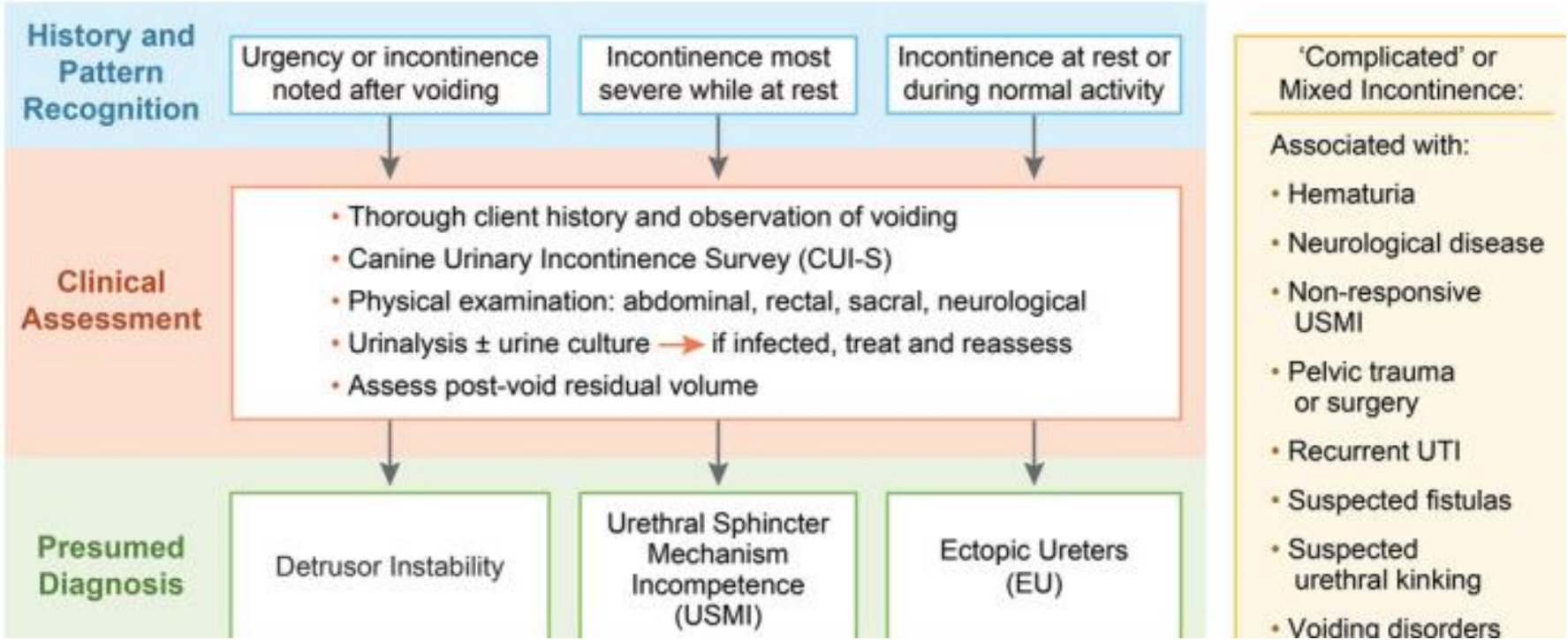
CANINE URINARY INCONTINENCE SURVEY (CUI-S)

This brief questionnaire is designed to assess the severity of your dog's urinary incontinence (involuntary urinary leakage). For each question, please mark the box associated with the response that best describes your pet's voiding habits during the past month.

Please answer the following regarding your dog's episodes of urinary incontinence over the past month:	Never	0-25% of the time	50-75% of the time	75-100% of the time	All of the time
Urinary Tract Signs Has your dog:					
Leaked or dribbled urine?					
Had episodes of small puddles of urine?					
Strained during urination?					
Had a weak or interrupted urine stream?					
Had blood in their urine?					
Needed to urinate during the night?					
Urinated on inappropriate surfaces? E.g. bedding or flooring					
Had excessive licking of genital area?					
Involuntary Urinary Leakage My dog:					
Leaks urine while being unaware					

https://pmc.ncbi.nlm.nih.gov/articles/instance/10937496/bin/JVIM-38-878-s002.pdf

Urinary Incontinence In Female Dogs



Idiopathic detrusor instability (IDI)

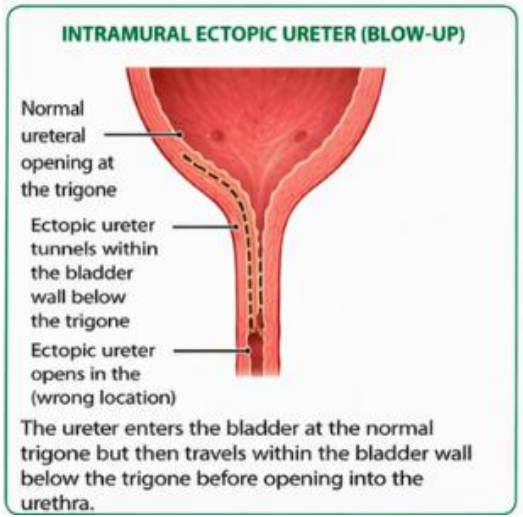
- Involuntary detrusor contractions during bladder filling phase
- Differentials:
  - Inflammatory/neoplastic conditions (cystitis, urolithiasis, neoplasia)
  - Idiopathic if no underlying cause identified
- Consider in dogs if:
  - Pollkiuria, urgency, and intermittent incontinence
  - Normal post voiding urinary volume
  - Negative urine culture

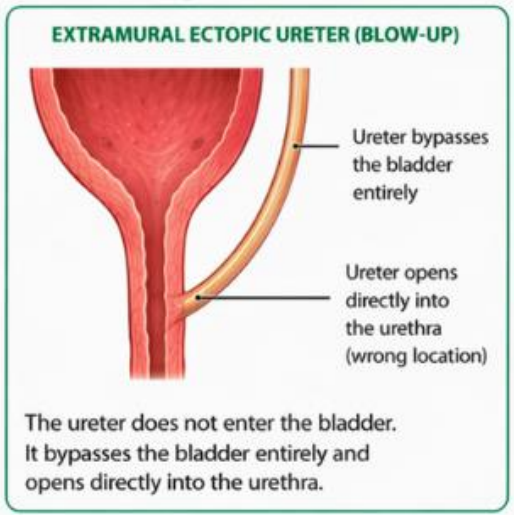
Idiopathic detrusor instability

- Cystometrography
  - Normal threshold volume ~ 13.5 mL/kg
  - In studied dogs ~ 4-6 mL/kg
- Treatment
  - Anticholinergic therapy
  - **Oxybutynin** most commonly recommended
    - 0.2 mg/kg PO q8-12h

Ectopic Ureter

- Most common cause of **juvenile incontinence** in dogs
- **Epidemiology**
  - 64-95% of canine ectopic ureters are intramural
  - Certain breeds overrepresented
    - Retrievers
    - Siberian Husky
    - Newfoundland
    - Poodles
    - Terriers
    - Bulldogs



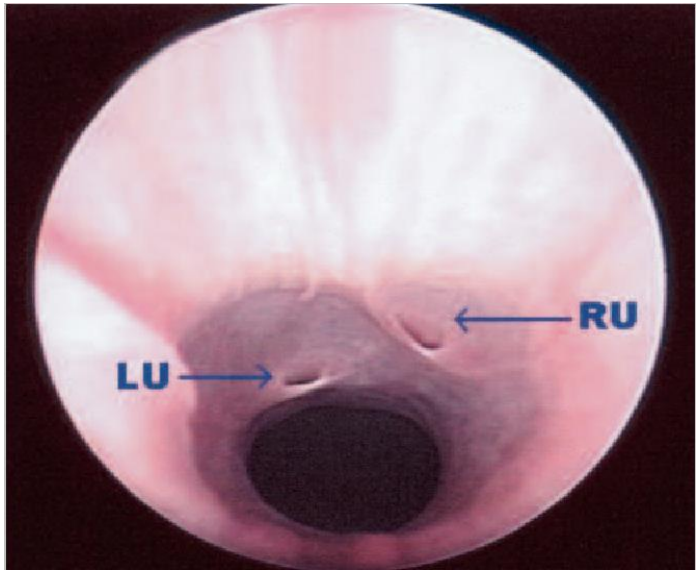


Ectopic Ureter – Clinical Presentation

- Continuous or intermittent dribbling
- Normal voluntary urination
- Recurrent UTIs
- Perivulvar dermatitis and urine staining
- **Male dogs:**
  - Incontinence mild/intermittent
  - May be asymptomatic



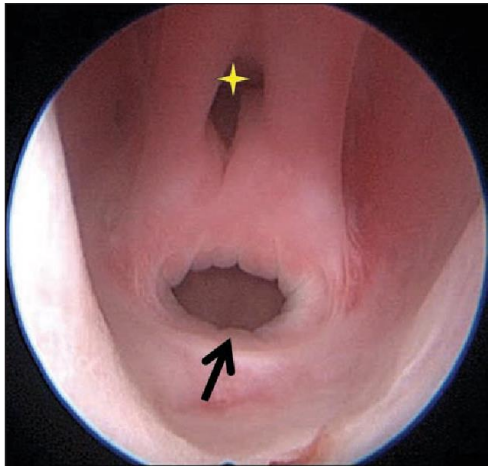
Ectopic Ureter - Diagnosis



- Cystoscopy is the gold standard
- Ultrasound is operator dependent
  - Sensitivity 93.5%
  - Specificity 100%
  - Accuracy 95%
- Computed tomography
  - In 2024 study on 50% accuracy for identifying normal ureters
  - Sensitivity for extramural ureters 29%

Concurrent Abnormalities

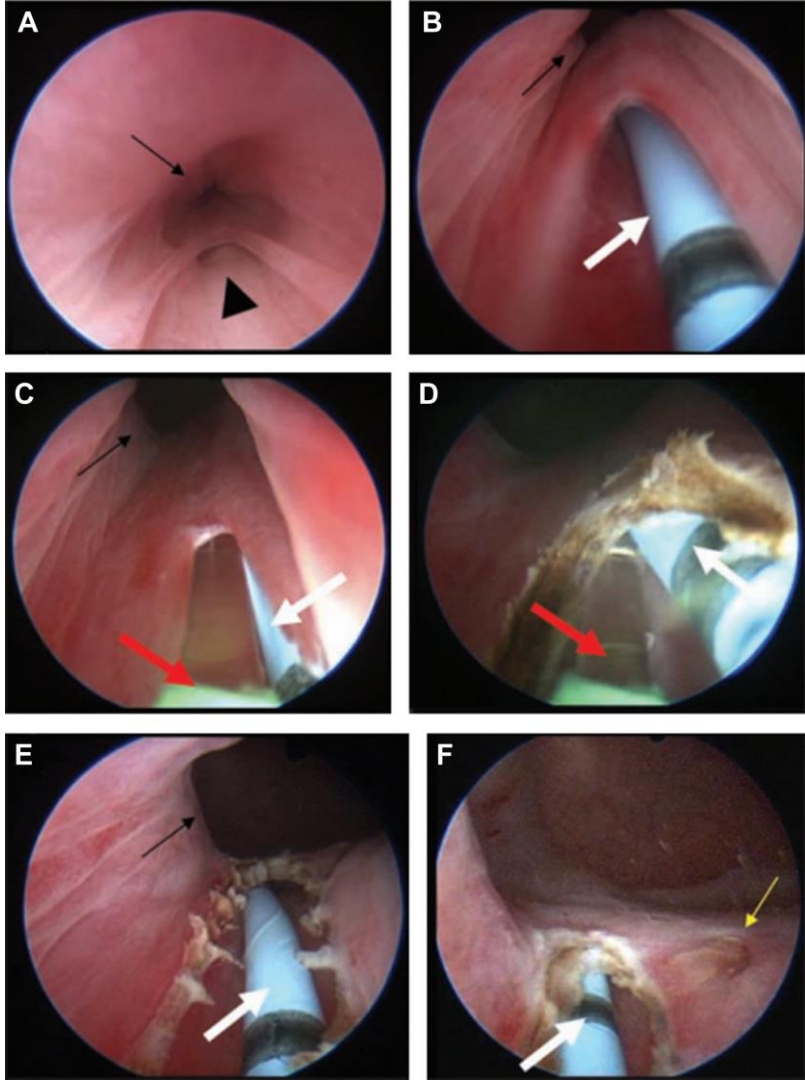
- Urinary abnormalities
  - Hydroureter/hydronephrosis
  - Renal dysplasia/dysgenesis/aplasia
  - Ureterocele
  - Pelvic or hypoplastic bladder
- Reproductive abnormalities
  - Vestibulovaginal septum
  - Recessed vulva
  - Vestibulovaginal stenosis





Ectopic Ureter - Treatment

- **Cystoscopy-guided laser ablation (CLA)**
- Surgical procedures
  - Laparoscopic ureteroneocystotomy
  - Neocystoureterostomy
  - Nephroureterectomy
- Complications
  - Minor/common: hematuria, pollakuira, cystitis, dysuria
  - Major:
    - CLA: Urethral tear/leakage, urethral stenosis
    - Surgery: Uroabdomen/leakage, ureteral obstruction/stenosis



Ectopic Ureter - Prognosis

- **Correcting the ureter does not always eliminate incontinence**
- Prognosis for continence **22-80%**
  - Concurrent USMI
  - Pelvic bladder
  - Neurogenic dysfunction
  - Recanalizaiton of ureteral remnant
  - Vestibulovaginal abnormalities
- Additional continence achieved with adjunctive medical therapy

Urethral Sphincter Mechanism Incompetence (USMI)

- Healthy FS dog with adult-onset passive urine leakage
- Relationship with ovariectomy/spay
  - 0.2-0.3% in intact vs. 3.1-20.1% among OHE females
  - Relative risk of 7.8 compared to intact females
  - Maximum urethral closure pressure and functional urethral length decrease following OHE within the **first 12-18 months following surgery**
  - Additional age-related anatomic, hormonal, or physiologic changes may reduce continence margin

Hormonal influence on continence

- Estrogenic compounds → modify/support urethral closure
  - Urethral smooth muscle function
  - Adrenergic responsiveness
  - Urethral mucosal/submucosal components
  - Vascularity of urethral tissues
  - Connective-tissue characteristics
- Gonadectomy changes much more than circulating estrogen!
  - Ovariectomy → loss of ovarian negative feedback → altered GnRH/gonadotropin environment
  - May further exacerbate urethral closure reserve

Evaluation of the prevalence of urinary incontinence in spayed female dogs: 566 cases (2003–2008)

Kara M Forsee [1], Garrett J Davis, Emily E Mouat, Katharine R Salmeri, Richard P Bastian

- 2013 retrospective study (n=566), there was no significant difference in age at OHE between continent and incontinent dogs

Later-age neutering causes lower risk of early-onset urinary incontinence than early neutering–a VetCompass target trial emulation study

Camilla Pegram [1,*], Karla Diaz-Ordaz [2], Dave C Brodbelt [1], Yu-Mei Chang [3], Jon L Hall [4], David B Church [5], Dan G O'Neill [1]

- 2024 retrospective study of spayed dogs (n = 612 early age and n = 888 later-aged) - **0.8 odds of UI in later aged spay**

Revisiting "Spay Incontinence"

Predisposing baseline factors

↓

Gonadectomy-associated endocrine changes

↓

Change in urethral physiology/closure pressure/smooth muscle

↓

Declining functional urethral reserve

↓

Clinical USMI

USMI – Medical Therapy

- Phenylpropanolamine (PPA)
  - Sympathomimetic, increases urethral smooth muscle tone/closure pressure
  - Efficacy: 75-90% improvement/control
  - Adverse effects: restlessness, anxiety, hypertension, agitation, tachycardia
- Estriol therapy
  - Estriol/Incurin, diethylstilbestrol (DES)
  - Mechanism not fully understood
  - Efficacy: 60-80% improve
- Combination therapy

USMI – Treatment Failure

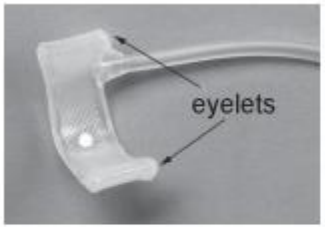
- Incorrect diagnosis
  - Ex: Ectopic ureter, neurologic disease, detrusor dysfunction
- Concurrent disease
  - Ex: UTI, polyuria with overflow incontinence

Urethral Bulking Procedures

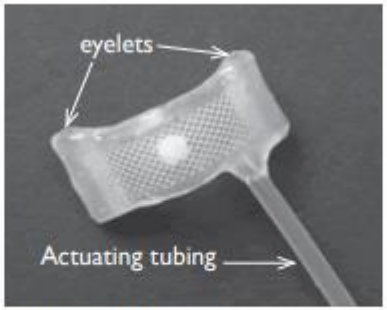
- Periurethral collagen injection
  - Initial success rate 70-85% for **short term improvement/control**
  - Effect diminishes over time, lower long-term success
- Newer endoscopic bulking agents are being explored....
  - More on this later!

Surgical intervention

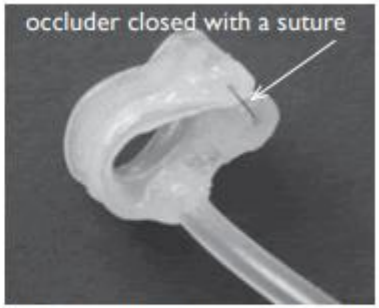
- Artificial Urethral Sphincter (AUS) Port System
  - Inflatable silicone occluder with titanium subcutaneous access port
  - 75-90% continence or marked improvement
  - Complications: infection, malfunction, obstruction, revision



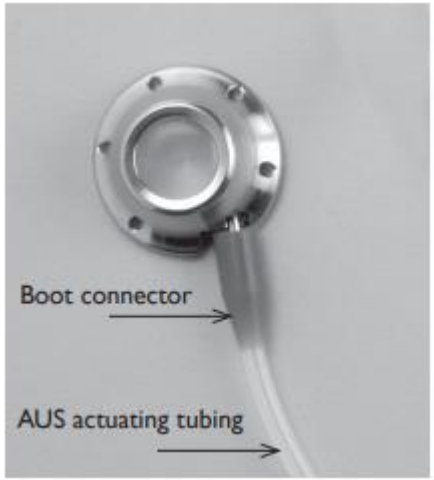
AUS occluder catheter showing the position of the eyelets that are used to close the occluder around the urethra



AUS occluder catheter open

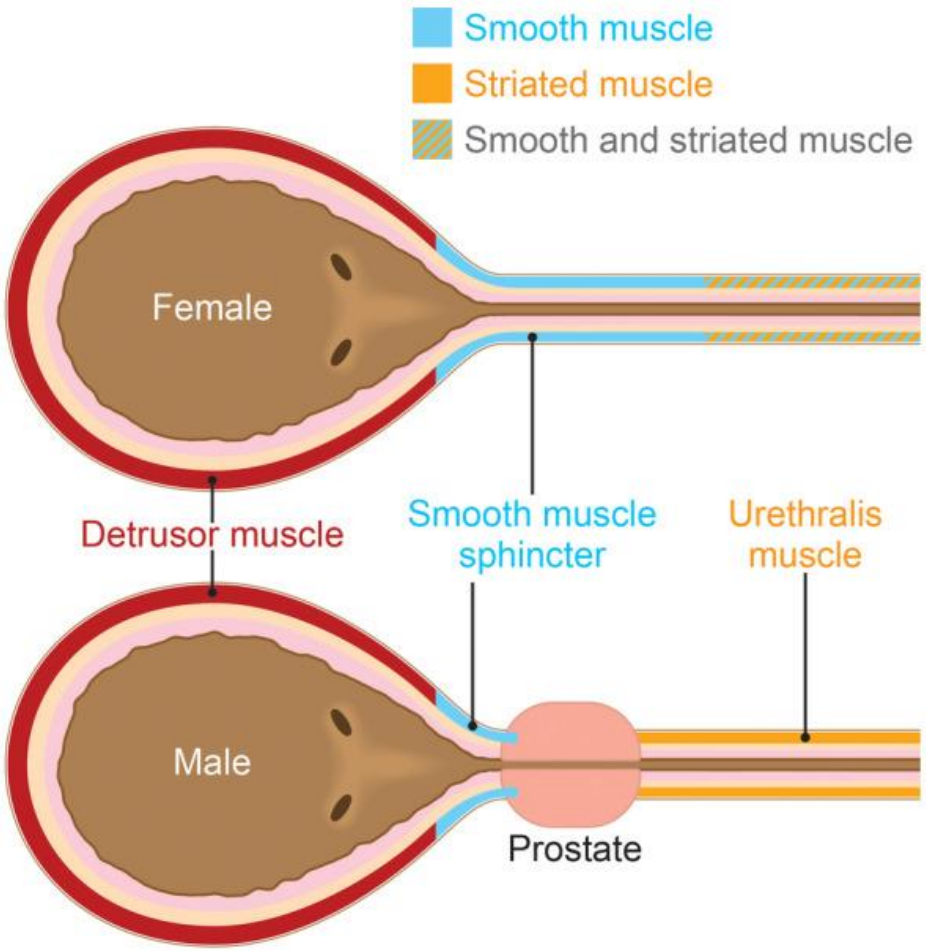


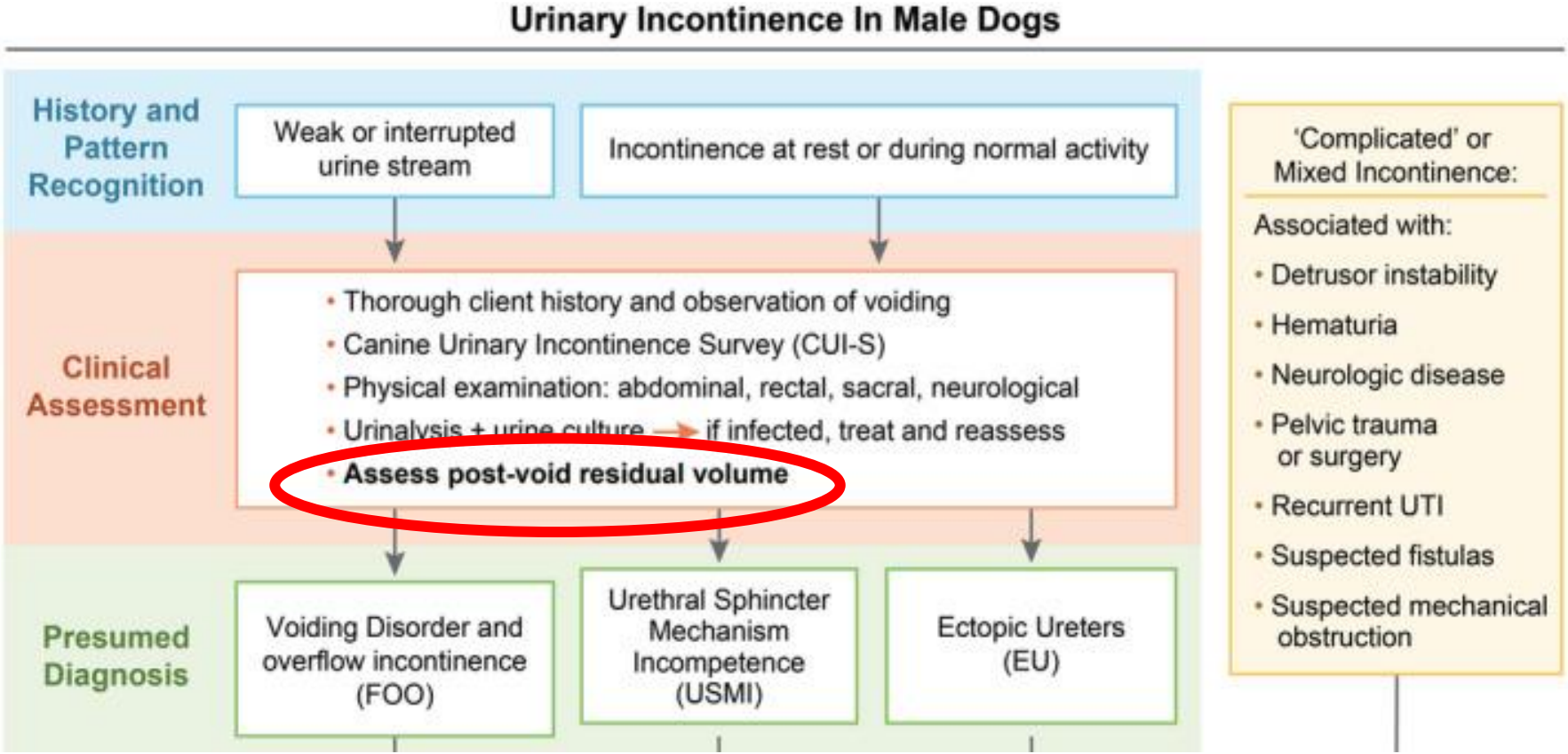
AUS occluder catheter is closed by placing a suture through the eyelets



USMI in male dogs

- Rare diagnosis in male dogs
- Underlying factors
  - Castration
  - Shorter urethral length
  - Pelvic bladder
- Treatment
  - Alpha-agonists (PPA)
  - Testosterone cypionate

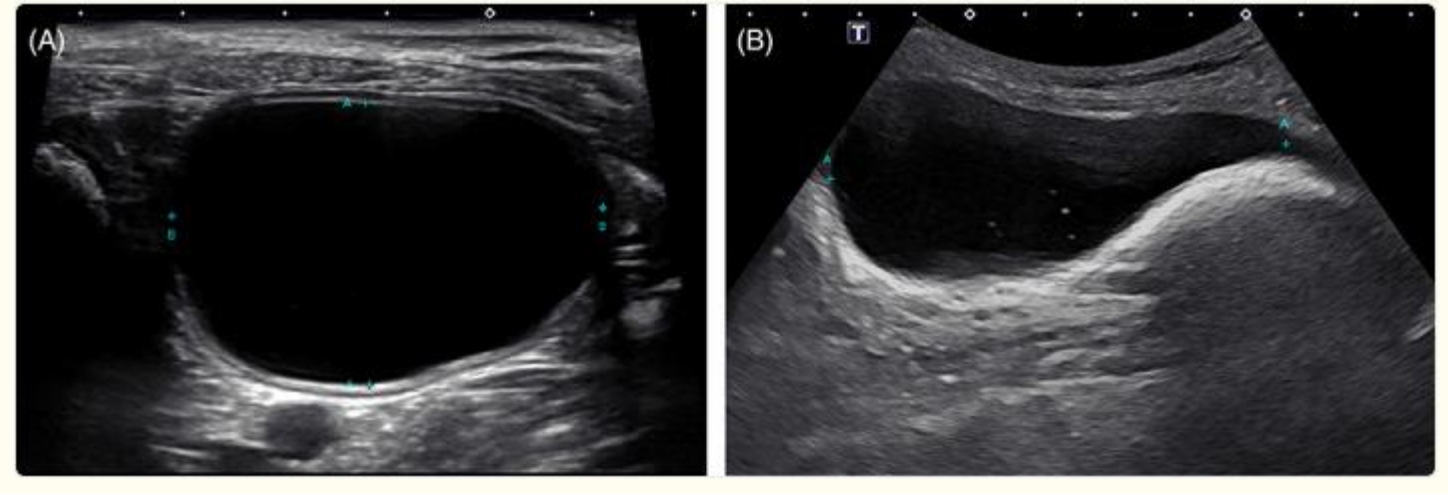



Urinary Incontinence In Male Dogs
History and Pattern Recognition
Weak or interrupted urine stream
Incontinence at rest or during normal activity
Clinical Assessment
• Thorough client history and observation of voiding
• Canine Urinary Incontinence Survey (CUI-S)
• Physical examination: abdominal, rectal, sacral, neurological
• Urinalysis + urine culture → if infected, treat and reassess
• Assess post-void residual volume
Presumed Diagnosis
Voiding Disorder and overflow incontinence (FOO)
Urethral Sphincter Mechanism Incompetence (USMI)
Ectopic Ureters (EU)
'Complicated' or Mixed Incontinence:
Associated with:
• Detrusor instability
• Hematuria
• Neurologic disease
• Pelvic trauma or surgery
• Recurrent UTI
• Suspected fistulas
• Suspected mechanical obstruction

Post-Void Residual Volume

- **Normal:** 0.2-0.4 mL/kg
  - < 10 mL total in a medium dog
- **Overflow incontinence:**
  - > 3 mL/kg

- **Measurement:**
  - Urethral catheterization
  - Ultrasound
    - **2D: L x W x H x 0.52**
    - 3D: faster, more accurate



Rukus – 5 YO MN Irish Wolfhound

- **Presenting complaint:** Dribbling urine, frequent urinations, restless
  - U-cath passed easily
  - 1.5 L removed (20.3 mL/kg)
- **Storage or voiding issue?**
- **Mechanical v. functional obstruction?**



Mechanical Outflow Obstruction (MOO)

- Examples:
  - Urethroliths
  - Stricture
  - Urethral neoplasia
  - Prostatic disease
  - Extramural compression
- Diagnosis:
  - Cystourethrogram
  - Cystoscopy



Functional Outflow Obstruction (FOO)

- Pathophysiology
  - Failure of detrusor contraction to coordinate with urethral relaxation
- **Detrusor-urethral dyssynergia (DUD)**
  - Young to middle-age males
  - Large breeds overrepresented
  - Clinical signs:
    - Straining and prolonged urination
    - Weak and interrupted stream
    - Multiple attempts to void
    - Post-void dribbling
    - Overflow incontinence in advanced cases



FOO - Treatment

- **Alpha antagonists:** smooth muscle relaxation
  - Tamsulosin
  - Prazosin
- **Benzodiazepines:** skeletal muscle relaxation
  - Diazepam
  - Lorazepam
  - Alprazolam
- **Cholinergic-muscarinic:** detrusor contraction
  - Bethanechol

Diagnostic approach to canine incontinence

Feature	Storage Disorder	Voiding Disorder
Bladder size	Usually normal or small	Often large/distended
Urine stream	Usually normal	Often weak, intermittent, prolonged
Residual urine	Minimal	Increased
Leakage pattern	Passive leakage from relatively normal bladder volume	Overflow leakage from overdistended bladder
Typical owner complaint	"Leaks while sleeping"	"Dribbles urine"
Urination frequency	May be normal or increased	Often increased attempts
Post-void residual	Normal	Elevated
Response to increasing urethral tone	Often improves	May worsen
Most common example	USMI	Functional/mechanical obstruction

What about cats?



Feline urinary incontinence: a retrospective case series (2009–2019)

Isabelle Mérindol [1,✉], Marilyn Dunn [1], Catherine Vachon [1]

- Neurologic in 17/35 (49%), non-neurologic in 18/35 (51%)
  - Neurologic: congenital (4/17) and trauma (7/17) overrepresented
  - Non-neurologic
    - **12/18 (67%) due to urethral obstruction** (stricture, cystitis, neoplasia, stone)
      - 5/12 suspected to have secondary detrusor atony
    - 5/18 due to bladder issues (atony, UTI)
    - 1/18 secondary to hepatic encephalopathy
- Contrast cystourethrography and cystoscopy diagnostic in 8/10
- Different than dogs – males overrepresented, older

What's new at Partner Vet?

MICTAMID®

BULKAMID®

- Novel bulking agent for canine USMI
  - 2.5% cross-linked polyacrylamide and 97.5% non-pyrogenic water
  - Biocompatible, non-biodegradable, non-migratory

Submucosal urethral bulking with 2.5% polyacrylamide hydrogel (Mictamid) for urinary incontinence in male dogs using a percutaneous fluoroscopically assisted perineal approach

Rae McAtee [1], Stephanie M Skinner [1], Jonathan D Foster [1]

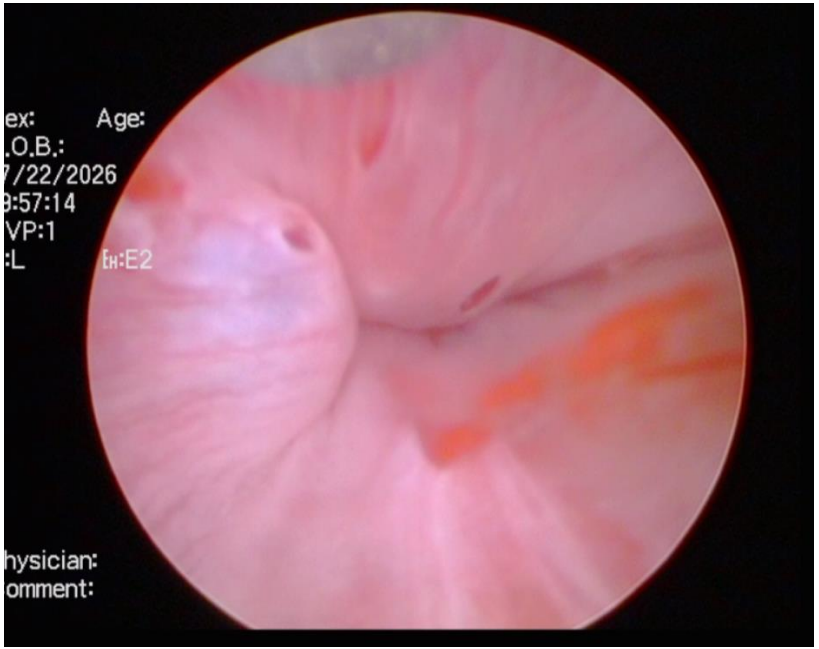
- Identical to Bulkamid – extensive long-term human data

Clinical outcomes with Bulkamid (Human)

Measure	Bulkamid Findings
Long-term cure/improvement	~67% at 7-years
Repeat injection rate	~32-36%
Subsequent continence surgery	~19.5% overall; 10% in one RCT
Success after failed sling	~67% improved/cured
UTI rate	3.5%
Prolonged bladder emptying (transient)	15.3%
Serious complications	Rare
Compared with TVT	Lower cure rate, improved safety/invasiveness

Current Mictamid experience

- 5.5 yo FS GSD mix
  - Complete control on Incurin
- 2.5 yo FS Vizla
  - Refractory to Incurin
  - Behavioral changes with PPA
  - Cystoscopy: short urethra
  - Persistent incontinence
- 2 yo FS Cattle Dog
  - Refractory incontinence with PPA and Incurin





Candidates for Mictamid Procedure

- **Female dogs** with diagnosed or strongly suspected USMI
- Systemically healthy
- Recent (within 1-month) normal CBC, chemistry panel and urinalysis
- No evidence of UTI
  - Urine culture required if active sediment on urinalysis
  - Presence of UTI is a contraindication for procedure
- Interested? Please contact me: mlester@partnervesc.com

Future goals:

Laser lithotripsy



Thank you for listening!

Questions?

Mlester@partnervesc.com

Partner Veterinary
EMERGENCY & SPECIALTY CENTER

