A person wearing teal scrubs is holding a tabby cat. The cat is looking towards the camera. The background is a blurred veterinary clinic setting.

Feline lower urinary tract disease: it's complicated.

Update on diagnosis and treatment.

Bill Saxon, DVM, DACVIM, DACVECC

IDEXX Medical Education Specialist

Disclosure:
Full-time Employee of IDEXX



The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical exam and presentation, and laboratory data. With respect to any drug therapy or monitoring program, you should refer to a product insert, for complete description of dosage, indications, interactions, and cautions, Diagnosis, treatment, and monitoring should be patient specific and is the responsibility of the veterinarian providing primary care.

FROM FUS TO PANDORA SYNDROME

Where are we, how did we get here, and where to now?

C A Tony Buffington
DVM PhD DACVN¹

Jodi L Westropp
DVM PhD DACVIM²

Dennis J Chew
DVM DACVIM¹



Prevalence, Risk Factors, Pathophysiology, Potential Biomarkers and Management of Feline Idiopathic Cystitis: An Update Review

Chengxi He, Kai Fan, Zhihui Hao, Na Tang, Gebin Li* and Shuaiyu Wang*

Review Article **Compte rendu**

In-hospital medical management of feline urethral obstruction: A review of recent clinical research

Kevin L. Cosford, Siu To Koo

Can Vet J 2020;61:595–604

What hasn't changed...



Lower urinary tract signs (LUTS):

- Dysuria
- Hematuria
- Pollakiuria
- Stranguria
- Periuria (behavioral inappropriate urination)



30+ causes of LUTS: what does your patient have?

- Idiopathic
- Urinary tract infection
- Urolithiasis
- Behavioral
- Neoplasia
- Trauma
- Incontinence
- Neurogenic
- Iatrogenic
- ...



Probably not urinary tract infection.

Especially if first episode at young age.

- Cats

- 1-3% all feline lower urinary tract disease
- Up to 50% in cats >10 yr

- Dogs

- 14% will develop UTI
- Female > male
- Increases with age



Prevalence

- FLUTD \approx 1.5-4.5% worldwide
- FIC among FLUTD cats 55-67% worldwide
- Non-obstructive FIC more common than obstructive
- Non-obstructive FIC
 - Single acute self-limiting episode in 80-90%
 - Frequently recurring
 - Persistent

FLUTD = feline lower urinary tract disease

FIC = feline idiopathic/interstitial cystitis



FIC risk factors

- Male
- Middle-aged (risk higher 2-7 vs <1 yr)\
- Purebred
- Longhaired
- Overweight
- Dry food, less water consumption
- **Stress**



FIC environmental stressors

- Shared food bowls
- Routine (vs free) feeding
- Number of litter boxes
- Clumping litter
- Indoor confinement
- Limited activities and hunting behaviors
- Limited access to high vantage points
- Inter-pet aggression (fear)
- Seasonal variation



FLUTD recurrence common regardless of etiology

- FIC 52-65%
 - Recurrence within 2 weeks up to 16 years
- Urethral obstruction 17-36%
- Recurrence might be different etiology
 - E.g., FIC may lead to uroliths or infection



What has changed...

Just about everything else:

- Terminology
- Pathogenesis/etiology
- Management

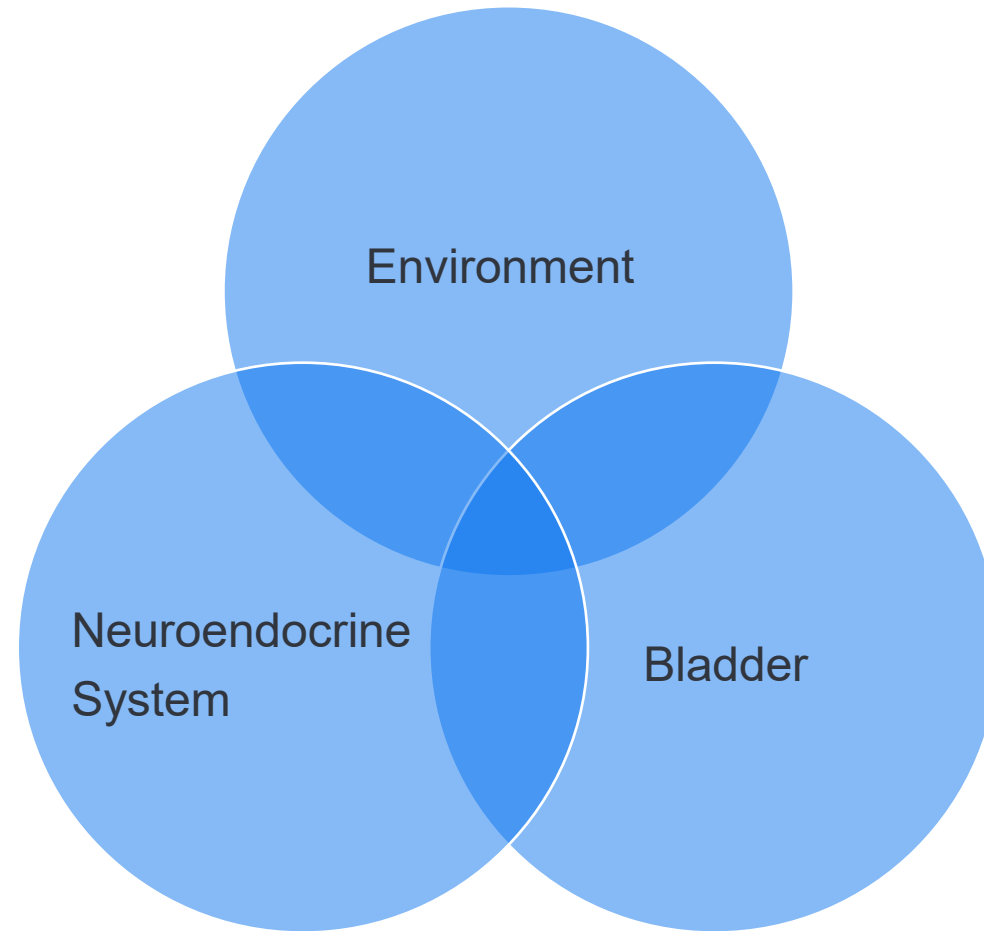


Changing terminology

- 1970 – FUS, feline urologic syndrome (Osbaldiston and Taussig)
- 1984 – FLUTD, feline lower urinary tract disease (Osborne)
- 1999 – FIC, feline idiopathic / interstitial cystitis (Buffington)
- Limitations
 - All narrow focus on lower urinary tract / bladder epithelium
 - None consider other abnormalities present



Pathogenesis: think outside the bladder.



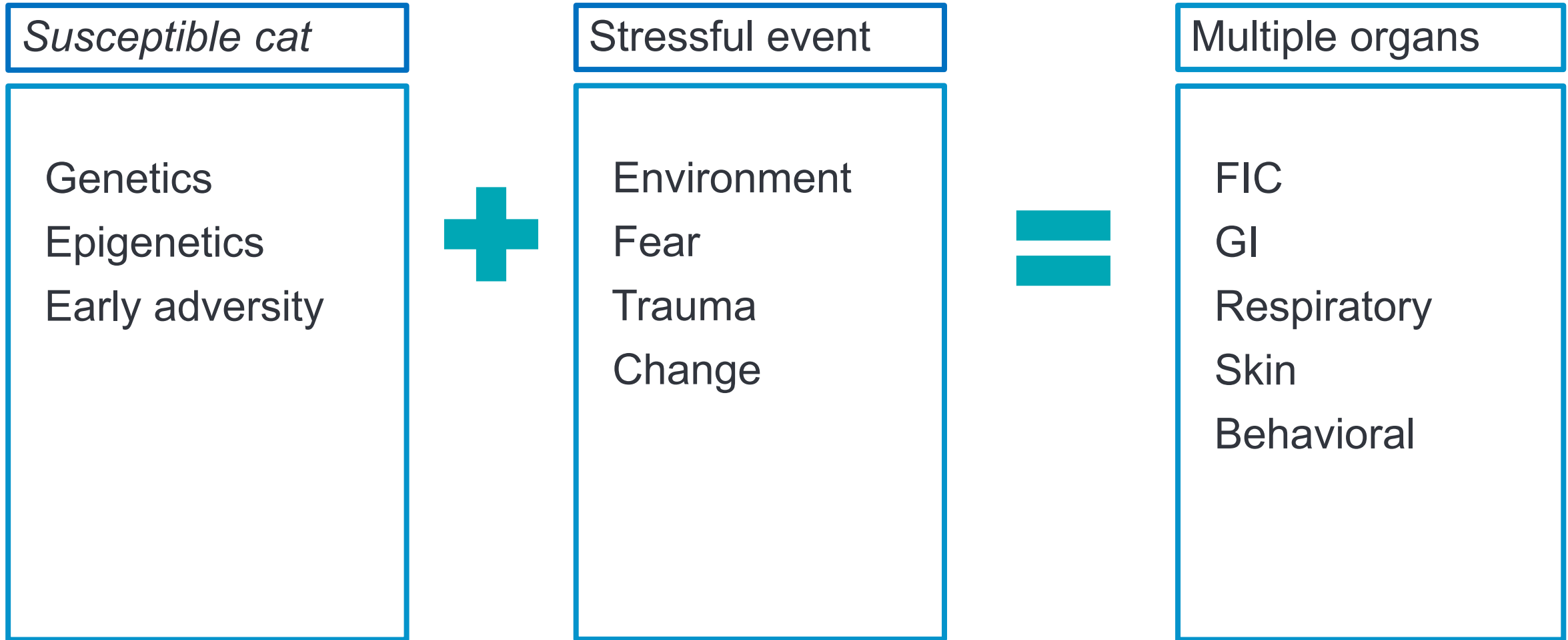


Altered neuroanatomy and transmitters in FIC cats

- Cholinergic system (acetylcholine)-induced hyperalgesia
- Sensory neuron anatomy and physiology differences
- Exaggerated acoustic startle response
- Heightened sympathetic nervous system state (norepinephrine)
- Hypothalamic-pituitary-adrenal axis abnormalities (suppressed)
- Histamine release locally (mast cells adjacent to sensory neurons)
- Suppressed or exaggerated release of various neurotransmitters
- Frequent behavioral, endocrine, cardiovascular, skin, GI comorbidities
 - Exacerbated by stress

Net effect – compromised urothelial barrier exposes sensory afferent neurons.

Current FIC pathogenesis:





Bottom line:

Stressors induce cascade of neural, endocrine, immune changes that affect multiple body systems

Don't limit diagnostic to evaluation to lower urinary tract

Other systems?

Behavioral abnormalities?

Managing cats with lower urinary signs



First episode in young healthy cat, unobstructed

- Sickness behavior (stress) or acute idiopathic LUTS
- Urolith and urinary tract infection *possible*
- Discuss with owner
 - Spontaneous resolution likely within a few days in most
 - Multimodal environmental enrichments to minimize recurrence
 - Watchful waiting
 - Additional diagnostics – imaging, urine culture/susceptibility if necessary
- Encourage water consumption, subcutaneous fluids ok

Single acute self-limiting episode in 80-90%



If prior episodes, other problems, >8 yrs of age, obstructed...

- Rule out calculi, infection, neoplasia, anatomic anomalies
- CBC, biochemistry
- Complete urinalysis
- Urine culture and susceptibility
- T4 if >5-7 yr
- FeLV/FIV
- Imaging
- Cystoscopy/urethroscopy
- Biopsy



Contents lists available at [ScienceDirect](#)

The Veterinary Journal

journal homepage: www.elsevier.com/locate/tvjl



International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats



J. Scott Weese^{a,*}, Joseph Blondeau^{b,c}, Dawn Boothe^d, Luca G. Guardabassi^{e,f}, Nigel Gumley^g, Mark Papich^h, Lisbeth Rem Jessenⁱ, Michael Lappin^j, Shelley Rankin^k, Jodi L. Westropp^l, Jane Sykes^l



FIC treatment

Long-term multimodal environmental enrichment

Anti-anxiety drugs

Nutritional supplements



Managing FIC begins with:

- Thorough history – stressors?
- Complete physical exam – lower urinary tract last
- Where obtained, orphan, etc...
- Other current health / behavior problems
- Environment – indoor/outdoor, activity level, litter box management, other pets...
- Clinical signs of GI, skin, lung, allergic conditions
- Unusual behaviors



Multimodal environmental modification (MEMO) (aka Feline environmental enrichment)

- Addition of 1+ factors to suboptimal environment to improve physical and psychological well-being
 - Improves clinical signs of LUTD and comorbidities
- Minimize interpet conflicts
- Provide all necessary resources
- Optimize interaction with caregivers
- Make any changes gradually

Enrich environment before using drugs



5 Pillars of Healthy Environment



1st Pillar: Safe places

- Home
 - Hiding boxes, elevated vantage points, multiple entries/exits
- Transport
 - Carrier, box, cover
- Clinic
 - Hiding box, cover front of cage



2nd Pillar: Separate spaces for food, water, litter box

- As many resources as cats plus one in various locations
- Fresh food and water in regularly cleaned bowls
- Litter boxes 1.5 x length of cat nose to tip of tail
 - Quiet, convenient location with escape route
 - Covered, uncovered based on cat preference
 - Unscented clumping litter w sand-like texture appealing to most
 - Scoop litter daily, change completely weekly
 - Sides not too high for older cats



3rd Pillar: Play and predatory behaviors

- Encourage especially with indoor cats
 - Lack may increase stress-related behaviors
- Hide food in multiple locations
- Food puzzles
- Variety of toys – laser pointers, feathers, ropes
- Encourage playful interactions with owner
- Multiple play areas, different height vantage points
- Base on cat preference, rotate/change to maintain interest



4th Pillar: Positive interaction with caregiver

- Consistent high frequency low intensity interaction (10-15 to 30 min/day)
- Tailor timing, activity to cat preference
- 2-7 wk of age critical socialization period
- Early friendly rearing to minimize future stress/fear



5th Pillar: Environment that respects cats' senses

- Cats use smell and pheromones to evaluate surroundings, establish boundaries
- Minimize chemicals, scents that interfere with olfaction
- Limit unfamiliar smells, noises, objects, and animals
- Catnip, lavender with video and audio simulations for enrichment



Drugs for acute FIC

- No antibiotics unless p/u or post urethral catheterization
- No prednisolone
- Consider antispasmodics
 - Oxybutynin, 1.25-10 mg/pet BID-TID PO
 - Prazosin, 0.5 mg/cat BID PO
 - Phenoxybenzamine 2.5 mg/cat BID PO
- Opioid analgesia - butorphanol, buprenorphine, fentanyl
- Consider NSAIDS meloxicam, robenacoxib, piroxicam...
 - Only if appetite normal



Drugs and diet for chronic FIC

- Alprazolam, 0.125-0.5 mg/cat BID PO
- Amitriptyline, 0.5-2.0 mg/kg SID PO
- Feliway® (no benefit in some controlled studies)
- Oral / intravesical GAGs no benefit (PPC, glucosamine, chondroitin sulfate...)
- Prescription diet c/d™ Multicare Feline Dry, c/d™ Feline Urinary Stress Chicken



Blocked cat update

- Bacteriuria uncommon at presentation
- Recurrence rates decreasing as care improves
- Decompressive cystocentesis safe
 - Scant effusion present in up to 1/3 on admission, may develop post cysto in some
 - Spontaneous resolution with no clinically relevant consequences
- 3.5 Fr catheter red rubber, polypropylene, -urethane, -vinyl catheter
- Closed collection system, bag below cat, no additives
- Catheter in 24 hr or until urine clear, whichever is longer
- Bladder lavage, infusions, antispasmodics, NSAIDs unproven
- Recurrence least in young, long indwelling catheter time, canned food at discharge



Effect of prazosin on feline recurrent urethral obstruction

Kayla R Hanson¹ , Elke Rudloff¹, Lingnan Yuan², Jonathan P Mochel² and Andrew KJ Linklater¹

Journal of Feline Medicine and Surgery
2021, Vol. 23(12) 1176–1182
© The Author(s) 2021
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1098612X211001283
journals.sagepub.com/home/jfm

This paper was handled and processed by the American Editorial Office (AAFP) for publication in *JFMS*




JOURNAL OF
**Veterinary Emergency
AND Critical Care**



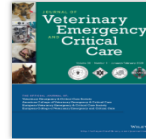
ORIGINAL STUDY |  Full Access

Association of abdominal effusion with a single decompressive cystocentesis prior to catheterization in male cats with urethral obstruction

Katherine K. Gerken DVM, Edward S. Cooper VMD, MS, DACVECC , Amy L. Butler DVM, MS, DACVECC, Dennis J. Chew DVM, DACVIM

First published: 16 December 2019 | <https://doi.org/10.1111/vec.12914> | Citations: 9

Presented as an oral presentation at the International Veterinary Emergency and Critical Care Symposium, San Diego, CA, September 2013.




Volume 30, Issue 1
January/February 2020
Pages 11-17

JOURNAL OF
**Veterinary Emergency
AND Critical Care**



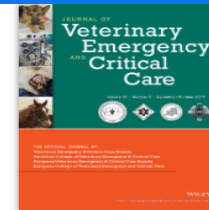
ORIGINAL STUDY

Incidence of bacteriuria at presentation and resulting from urinary catheterization in feline urethral obstruction

Edward S. Cooper VMD, MS, DACVECC , Emma Lasley DVM, Joshua B. Daniels DVM, PhD, DACVM, Dennis J. Chew DVM, DACVIM

First published: 27 June 2019 | <https://doi.org/10.1111/vec.12870> | Citations: 8

Abstract presented at the 19th International Veterinary Emergency and Critical Care Symposium, September 7–11, 2013, San Diego, CA.



Volume 29, Issue 5
September/October 2019
Pages 472-477



Hyperkalemia in blocked cats

- Bradycardia *and* hypothermia specific for hyperkalemia (>8 mEq/L)
- 10% Ca gluconate, 3 ml/cat over 10-15 minutes if arrhythmia
 - Effect immediate, duration 30-60 minute
- Regular insulin, 1 U/cat, 3 cc 50% dextrose/cat diluted, then 2.5-5% glucose CRI
 - Onset 15 minutes, peak correction of K 30-60 minutes
- NaHCO₃ only if pH<7.05, HCO₃ < 10 mEq/L
 - 1-2 mEq/kg diluted 1:4 over 15 minute to correct 50-75% deficit
 - Very rarely necessary, try to avoid

Key takeaways:

- Bladder may be victim of systemic process due to sensitized central stress response system
- LUT and other signs when sensitive cat experiences stressor
- 'Healthy' cats can be affected if experience sufficient stress
- Multimodal environmental enrichment paramount
- Most acute FIC episodes self-limiting
- Thorough evaluation of LUT, comorbidities, behavioral abnormalities necessary in chronic / recurrent cases

Thank you!



Effect of prazosin on feline recurrent urethral obstruction

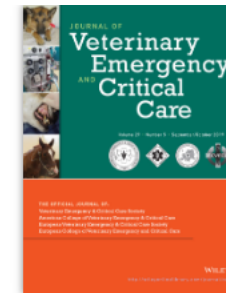
Kayla R Hanson¹, Elke Rudloff¹, Lingnan Yuan², Jonathan P Mochel² and Andrew KJ Linklater¹

Journal of Feline Medicine and Surgery
2021, Vol. 23(12) 1176–1182
© The Author(s) 2021
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1098612X211001283
journals.sagepub.com/home/jfm

This paper was handled and processed by the American Editorial Office (AAFP) for publication in *JFMS*




+ etet



Volume 29, Issue 5
September/October 2019
Pages 472-477

ORIGINAL STUDY

Incidence of bacteriuria at presentation and resulting from urinary catheterization in feline urethral obstruction

Edward S. Cooper VMD, MS, DACVECC , Emma Lasley DVM, Joshua B. Daniels DVM, PhD, DACVM, Dennis J. Chew DVM, DACVIM

First published: 27 June 2019 | <https://doi.org/10.1111/vec.12870> | Citations: 8

Abstract presented at the 19th International Veterinary Emergency and Critical Care Symposium, September 7–11, 2013, San Diego, CA.

Advertisement





+ tihithat

Received: 7 October 2021 | Revised: 13 July 2022 | Accepted: 16 July 2022

DOI: 10.1111/vec.13333

BRIEF COMMUNICATION



Retrospective evaluation of the incidence of presumed feline urethral obstruction during a prepandemic year compared to a pandemic year

Jessica B. Kerley VMD¹  | Kelly M. Tart DVM, DACVECC¹ | Aaron Rendahl PhD²  |
Lisa L. Powell DVM, DACVECC³

Received: 19 March 2018 | Revised: 6 June 2018 | Accepted: 9 August 2018

DOI: 10.1111/vec.12945

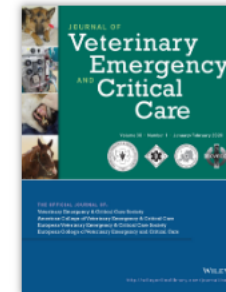
BRIEF CLINICAL COMMUNICATION



+ **tjijtj**

Retrospective evaluation of urinary indwelling catheter type in cats with urethral obstruction (January 2014 to December 2014): 91 cases

Elizabeth B. Davidow DVM, DACVECC



Volume 30, Issue 1
January/February 2020
Pages 11-17

ORIGINAL STUDY | Full Access

Association of abdominal effusion with a single decompressive cystocentesis prior to catheterization in male cats with urethral obstruction

Katherine K. Gerken DVM, Edward S. Cooper VMD, MS, DACVECC , Amy L. Butler DVM, MS, DACVECC, Dennis J. Chew DVM, DACVIM

First published: 16 December 2019 | <https://doi.org/10.1111/vec.12914> | Citations: 9

Presented as an oral presentation at the International Veterinary Emergency and Critical Care Symposium, San Diego, CA, September 2013.

- Figures
- References
- Related
- Information

Recommended

Retrospective evaluation of urinary indwelling catheter type in cats with urethral obstruction (January 2014 to December 2014): 91 cases



Male cat urethral obstruction update

- + Autonomic nervous system imbalance, blunted response to cortisol, stress = inflammation
- + UTI <10%
- + Bladder stones 20-30%
- + Recurrence 15-38% - rate decreasing as care improves
- + Correct fluid/electrolyte imbalance, ECG and analgesics in all *before* urinary catheter
- + Treat hyperkalemia if causing clinical signs
- + Consider decompressive cystocentesis, caudal epidural
- + 3.5 Fr red rubber, polypropylene, polyurethane, polyvinyl catheter, sterile lube
- + Indwelling urinary catheter 24-72 hr or when urine clear whichever is longer
- + Bladder lavage, infusions, prazosin, meloxicam not helpful



Happy to take questions

