

Urinary Incontinence in Dogs

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Incontinence is reported to occur in between 5-20% of neutered female dogs, and, whilst reported in males, it is much rarer. The most common causes of incontinence are urethral sphincter mechanism incompetence (USMI), ectopic ureters and urinary tract infections (UTIs). Other causes include PUPD, urge incontinence, detrusor instability, partial urethral obstruction and spinal disease. Signalment and a careful history can often help to narrow the differentials e.g.

- breed (there are breed predispositions for USMI and ectopic ureters),
- age (congenital USMI or ectopic ureters vs. acquired USMI),
- pattern of urination (leaving puddles with USMI, dripping with ectopic ureters, stranguria with UTI, location of urination in case of behavioural soiling),
- presence of PUPD.

The use of diagnostic tests will vary depending upon presentation. Measurement of water intake and urine sampling by cystoscopy can rule out simple causes such as PUPD or UTI. Other diagnostic tests that can be used will depend upon the availability of imaging tools and skill in using them. Plain radiographs are rarely helpful. Contrast radiographic studies can be useful for diagnosing USMI and ectopic ureter but require anaesthesia, are time consuming and can be challenging to perform, and may not always lead to a diagnosis. Ectopic ureters are commonly diagnosed by abdominal ultrasound and cystoscopy, although occasionally CT IVU (intravenous urography) may be useful. USMI remains a diagnosis by exclusion although many dogs have an intrapelvic bladder noted on retrograde studies. Some dogs with have both congenital ectopic ureters and USMI. Many dogs fulfilling the typical signalment and history of acquired USMI start a medical treatment trial with phenylpropanolamine without diagnostic testing, although urine culture is always beneficial, as USMI may not respond to medical management if there is concurrent UTI. Note that incontinent dogs are predisposed to USMI.

Acquired USMI

There is some weak evidence that neutering, particularly before the age of three months, increases the risk of urinary incontinence. However, overall the evidence is neither consistent nor strong enough to make firm recommendations on the effect of neutering or age at neutering on the risk of urinary incontinence.

First line treatment is the α -adrenergic agonist phenylpropanolamine, which increases urethral resistance. Dosing three times daily will increase efficacy. Most bitches (85%) will respond to medical management. Exogenous

oestrogens e.g. estriol can be used in addition as they improve smooth muscle contractility and improve the sensitivity to α -adrenergic stimulation, so that phenylpropanolamine works better.

Surgery is considered in dogs not responding sufficiently to medical therapy; dog in which the effects of the drugs diminish with time and incontinence becomes worse; where there are side effects; and where owners do not wish to medicate long term (especially young animals). The goals of surgery are to:

- increase urethral resistance e.g. artificial urethral sphincter (AUS), intraurethral bulking agent e.g. collagen, transvaginal tape/sling,
- move the bladder neck into the abdomen (colposuspension, urethropexy)
- increase urethral length e.g. bladder neck reconstruction (rarely performed).
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During colposuspension, the vagina is advanced cranially and sutured to the prepubic tendon on either side of the urethra. It reduces incontinence by increasing leak point pressures and decreasing maximum urethral closure pressures. Over time, gradual stretching of tissues can lead to a recurrence of incontinence. Dogs may then respond to medication, even if it hadn't worked previously. Colposuspension or other techniques can be repeated if incontinence recurs. Urethropexy also moves the bladder neck into a more abdominal position and may increase urethral pressure by forming a kink in the urethra. Following colposuspension or urethropexy, cure is seen in 40-55% of dogs, improvement in 27-42% and no change in 9-17%.

Percutaneously adjustable artificial urethral sphincters (AUS) can be used in both males and females, in dogs with ongoing incontinence after ectopic ureter surgery and in cats. Following placement of a sphincter cuff around the urethra, the cuff can be inflated with saline via a port under the skin. Continence rates were over 90% for dogs where owners presented them for adjustments to the fluid in the port and where medical management was used to improve continence.

Intraurethral bulking agents e.g. collagen, can be injected via a cystoscope at several sites around the circumference of the proximal urethra in a submucosal location. It can be performed on an outpatient basis. Up to 70% of dogs become continent (a further 25% are improved) and further improvements can be achieved with medication. However, nearly half of dogs will deteriorate over 12 months and require repeat treatment to maintain continence. The procedure is expensive due to the cost of the collagen.

Ectopic Ureters

Ectopic ureters are a rare cause of urinary incontinence but account for 50% of incontinence in young animals. The median age at diagnosis is 10 months but it may be seen in adults. Ureters generally enter the bladder serosa in a normal anatomical position, before travelling in a submucosal position to open distal to the trigone; most are in the distal bladder neck or the proximal to mid urethra. Up to 90% are bilateral. Two-thirds of dogs have concurrent UTI.

Hydroureter/hydronephrosis may develop due to functional obstruction of the ureter but even severe (but not end-stage) cases can resolve with surgery.

Cystoscopy is particularly useful for diagnosis as the opening of the ureters can be easily seen and the urethra can be examined for ectopic openings or abnormal jets of urine; however success is dependent on operator experience as it can be difficult to determine the normal position of ureteral entry. Cystoscopy is 100% diagnostic, whereas radiographic studies only identify approximately 80% of cases.

Ectopic ureters can be treated at open surgery where a new stoma is created between the ureter and the bladder in the bladder trigone. Surgery can be technically challenging, especially in young dogs, where swelling can lead to dysuria. Surgery resolves incontinence in 50% of dogs but success is unrelated to age at diagnosis, whether uni/bilateral or the presence of UTI. It may take 4-6 weeks for the outcome to be apparent. Persistent UTIs occur in 15-30% dogs.

A less invasive treatment is laser ablation of the common wall between the ectopic part of the ureter and the bladder/urethra via cystoscopy. The technique is technically demanding. Outcomes are similar to surgical correction; half of dogs are continent after treatment alone and a further quarter improve after treatment of presumed USMI with medication, transurethral bulking agent or placement of an AUS.

MCQs

1. Which cause of incontinence is most likely to present as leaving puddles of urinary rather than dripping urine?
 - a. Urinary tract infection
 - b. Ectopic ureter
 - c. Spinal tract disease
 - d. Urethral sphincter mechanism incompetence
2. What of these is the most likely infection seen in incontinent dogs with a urinary tract infection?
 - a. *Escherichia coli*
 - b. *Pseudomonas aeruginosa*
 - c. *Staphylococcus epidermidis*
 - d. *Enterococci* species
3. Which of the following breed of dog is predisposed to acquired urethral sphincter mechanism incompetence?
 - a. Golden retriever
 - b. Bichon frise
 - c. Standard poodle
 - d. Dalmation

4. What is the first line medical treatment for acquired urethral sphincter mechanism incompetence?
 - a. Estriol
 - b. Phenylpropanolamine
 - c. Desmopressin
 - d. Oxybutynin

5. What is the best advice to give for a 5-month-old female entire bitch with congenital urethral sphincter mechanism incompetence?
 - a. Let her have a season
 - b. Breed one litter of puppies from her
 - c. Perform colposuspension
 - d. Use both phenylpropanolamine and estriol

6. What advice is usually given to improve outcomes in dogs treated surgically for acquired USMI?
 - a. Combine surgical procedures at the first surgery
 - b. Use concurrent medical management
 - c. Neuter entire animals
 - d. Minimise water intake at night

7. Which complication might occur immediately after colposuspension?
 - a. Urinary tract infection
 - b. Urinary dyssynergia
 - c. Vaginal rupture
 - d. Faecal tenesmus

8. In colposuspension, the vagina is sutured to the:
 - a. Prepubic tendon
 - b. Inguinal ring
 - c. Pubis
 - d. Linea alba

9. What late complication is most commonly reported after artificial urethral sphincter placement?
 - a. Erosion of the urethral wall
 - b. Fibrosis around the urethra
 - c. Tumour formation in the urethra
 - d. Migration of the implant

10. What other technique has been described for treatment of acquired USMI in dogs?
 - a. Botulinum toxin injection
 - b. Posterior tibial nerve stimulation
 - c. Transvaginal tape
 - d. Xenograft sling

11. Which is the best diagnostic technique for diagnosing ectopic ureter?
 - a. Intravenous urography
 - b. Abdominal ultrasound

- c. Cystoscopy
- d. Exploratory surgery

12. What is the main disadvantage of cystoscopic submucosal collagen injection for treating USMI?

- a. Postoperative dysuria
- b. Increased incidence of urinary tract infections
- c. Duration of action of less than one year
- d. Precludes surgical management

13. How many dogs with ectopic ureters also have UTI?

- a. 5%
- b. 35%
- c. 65%
- d. 95%

14. Which is the least common location for ectopic ureter to open in bitches?

- a. Proximal urethra
- b. Distal urethra
- c. Vagina
- d. Uterus

15. Tumours of the bladder and urethra can cause incontinence. What is the most common tumour type in dogs?

- a. Transitional cell carcinoma
- b. Lymphoma
- c. Fibrosarcoma
- d. Leiomyoma