Fixing the Dripping Tap! Urinary Incontinence in Dogs and Cats

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Fixing the dripping tap - what are the management options for urinary incontinence?

Causes of incontinence

- Congenital abnormalities
  - Ectopic ureters
  - Intersex abnormalities
  - Genitourinary dysplasia
- Urethral Sphincter Mechanism Incompetence
- Partial mechanical urethral obstruction
- Neurogenic
  - Upper / lower neurone
  - Reflex dyssynergia
- Urinary Tract Infection

Diagnosis of urinary incontinence

**History:** Obtaining and accurate history is an essential component of an incontinence investigation. The presence of true incontinence needs to be ascertained. Incontinence is leakage of urine with the animal unaware at a different time from voluntarily urination. The episodes of incontinence can reflect the possible pathology in that congenital abnormalities are typically associated with persistent incontinence compared with USMI in which incontinence is typically associated with sleep or lateral recumbency. Incontinence should be differentiated from increased urinary frequency, inappropriate urination and polyuria. The patient signalment needs to be considered as age breed and neutering status all influence the likely diagnosis. In addition to obtaining information regarding the pattern of incontinence, urination behaviour
needs to be interrogated and preferably observed. Urine flow initiation, duration, ‘diameter’ and cessation can all help differentiate partial mechanical obstruction and reflex dyssynergia from other causes of incontinence. Lastly a full medical history including response to previous treatments, presence of concurrent medical complaints will help differentiate between potential non incontinence urinary complaints e.g. renal disease and UTI and true urinary incontinence.

**Examination:** Physical examination needs to include abdominal palpation to determine bladder size (upper motor neurone bladder large and difficult to express / lower motor bladder moderate size and easily expressed / partial mechanical obstruction and urine overflow bladder large) and presence of organomegaly. External genitalia needs to be closely inspected for presence of intersex abnormalities. Rectal digital examination is performed to palpate the pelvic urethra.

**Urinalysis / haematology / serum biochemistry:** Urine collected by cystocentesis or aseptic catheterisation technique is submitted for USG, sediment analysis, culture and sensitivity and dipstick to assist in ruling out renal insufficiency or disease, urinary tract infection and urolithiasis in conjunction with data from haematology and serum biochemistry.

If concurrent urinary tract infection is identified then it should be managed preferably on the basis of culture and sensitivity for a minimum 3 weeks with re-culture 2-3 days after completing course.

**Diagnostic imaging:** Contrast radiography remains the mainstay imaging modality for investigating urinary incontinence. Ultrasound compliments radiographic studies and can evaluate bladder, kidneys very well. Evaluation of ureters/trigone is generally only achieved by experienced operators. Inducing diuresis can be helpful for enhancing imaging of the ureteric openings.
Performing a urinary tract radiographic investigation

A large variety of contrast media can be used. Common brands are Urografin (meeglumine iothalamate combined with sodium diatrizoate) and Omnipaque (Iohexol). My preferred choice is Omnipaque. For optimum studies an enema should be performed the evening and morning before the study to avoid faeces in the colon obscuring the image of the ureters.

For urinary tract studies general anaesthesia is required. Owners should be advised that in rare instances adverse reactions can occur to contrast material (anaphylaxis) and deterioration in renal function. The first study performed is an intravenous urogram (IVU), also known as an excretory urogram.

**IVU**

Anaesthetise the animal and avoid intravenous fluid therapy until after the IVU has been performed. Place a large gauge intravenous catheter in a cephalic vein. Perform a plain lateral and ventro-dorsal abdominal radiograph to confirm exposures / positioning and rule out any diagnoses that can be achieved without contrast studies (these should include the kidneys, ureters and bladder). Catheterise the animal in an aseptic manner and empty the bladder. A urine sample can be collected for urinalysis and bacteriology if this has not been done previously. Inject approximately 1-2 ml/kg air. This is to allow a good view of the ureters entering the bladder. It is stated that the risk of a fatal air embolism occurring is reduced if CO$_2$ is used in preference to air.

Position the animal in dorsal recumbency, and position the x-ray machine for a ventro-dorsal radiograph of the cranial abdomen (to show kidneys and proximal ureters). Inject intravenously via cephalic catheter 700 mg/kg iodide rapidly (Urografin is typically 370 mg/ml hence 2 ml/kg is injected). On finishing the injection take the first radiograph immediately. If the first radiograph shows the vascular phase then repeat immediately to capture the nephrogram phase. Repeat the ventro-dorsal radiograph at 5 minutes and 10 minutes, moving caudally to include the bladder at 10 minutes. At 10 minutes also perform a right lateral abdominal radiograph and repeat this at 15 minutes centered over the caudal abdomen with an increased x-ray exposure.
Typically opacification of the ureters has occurred by 10 minutes. It is normal to have contrast defects in the ureters caused by peristalsis. Occasionally additional radiographs will be required at 20 minutes. Commence intravenous fluid therapy with a balanced crystalloid solution.

**Retrograde urethrocystogram / vaginourethrocystogram**

Continue with this study immediately after an IVU or as a sole study for lower urinary tract disease. Perform a lateral abdominal radiograph to confirm positioning and exposures. In male dogs, if the region of interest is the perineal urethra the hind limbs need to be drawn forward. Withdraw the catheter to the tip of the penis and clamp in place. In the case of bitches place a Foley catheter just within the vulvar lips, inflate the catheter balloon and clamp in place. In both cases pre fill the catheter with contrast to remove air. Wear appropriate protective clothing (lead apron and gloves, etc.) and pre-fill a syringe with 50% contrast and 50% sterile water for injection at 1 ml/kg. Inject the contrast under pressure into the pre-placed catheter and have an assistant take a radiograph before finishing the injection. If there is insufficient filling then the study can be repeated.

In bitches it is important to ensure that they are not in season or on oestrogen therapy as the vagina becomes distensible under the influence of oestrogens and will fill with contrast in preference to the contrast travelling in a retrograde fashion up the urethra into the bladder. In order to perform a double contrast cystogram catheterise the bladder and remove the majority of the contrast material. Then distend the bladder with a moderate volume of air. This is particularly useful to highlight radiolucent stones.
Urethral sphincter mechanism incompetence

USMI is the most common cause of incontinence in bitches. It has a proven relationship to spaying, particularly early spaying. Old English sheep dogs, Irish setters, boxers and Dobermans are all breeds that appear to be at risk of developing USMI hence spaying following oestrus should be considered in these breeds. Male dogs rarely suffer from USMI.

Diagnosis of USMI is by exclusion of other pathology that can result in incontinence including UTI and congenital abnormalities. An intra-pelvic bladder position is often identified though this is not diagnostic of USMI and is frequently identified in dogs who do not suffer from USMI, particularly young dogs. Urethral pressure profilometry provides the only positive test for USMI however it is a research tool which is impractical and unreliable in clinical setting.

Medical management of should include weight loss in the overweight patient, treatment of concurrent UTI and pharmaceutical manipulation of urethral tone. Male dogs are generally less responsive to medical management. The predominant drugs used are oestrogens which increase urethral smooth muscle $\alpha$ adrenergic receptor responsiveness to sympathomimetics or phenylpropanolamine an $\alpha$ adrenergic agonist. Diethylstilbestrol is frequently used in Australia and the US but can result in permanent bone marrow toxicity and hence is rarely used in the UK. Approximately 65% of dogs will have improved continence when administered diethylstilbestrol. Oestriol is an alternative to diethylstilbestrol without the potential for bone marrow toxicity. Reported continence rates vary from 40 – 80%. Phenylpropanolamine has excellent efficacy with 85 – 95% continence rates. Side effects include gastrointestinal upsets, aggression and restlessness all of which resolve with discontinuation of therapy. In male dogs testosterone is prescribed with varied results.

There has been a recent diversification of surgical management options available for managing patient’s refractory to medical management. Colposuspension and urethropexy reposition/fix the bladder neck in intra-abdominal position. Transurethral intramural collagen injections and hydraulic occluders are used to augment the
internal sphincter. Trans-obturator vaginal tape is been evaluated as a system to support/compress the bladder neck.

Colposuspension
Outcome

Colposuspension
50% cured, 40% improved

Urethropexy
56% cured, 27% improved
Case selection and experience dependent for good outcomes
Gradual loss of continence over time in some patients
Potential for transient urinary obstruction

Urethral bulking
53% success (more recently 68% reported)
>1 treatment
Duration of effect 16 month mean

Hydraulic occluder
High continence rates - NOT 100%
Requires subtle adjustments
Potential for urinary retention
Recurrent UTI requiring evaluation every 6 months
Potential for urethral atrophy

Management of Recurrence
A common cause of recurrent incontinence following surgery is recurrent UTI or weight gain. All patients with recurrent should have urine culture and analysis of a sample collected by cystocentesis. The patient’s body score should be critically evaluated. For those dogs without UTI or weight gain frequently surgical procedures enhance responsiveness to medical management and continence can be achieved with adjunctive pharmaceutical management.