URINARY INCONTINENCE IN DOGS

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discuss, in the first of a two-part article, approaches to this common presentation

Figure 1. Urinary incontinence can cause skin infections around the vulva/labia, hindlimbs and ventrum.

Figure 2. An example of a normal pre-contrast lateral abdominal radiograph of a two-year-old neutered bitch with urinary incontinence. A plain dorosventral abdominal radiograph should also be performed.

Figure 3 (left). Dorosventral abdominal radiograph of the bitch in Figure 2, showing a normal nephrogram (two well-defined, smooth kidneys of normal size and position are identifiable). Figure 4 (right). Normal ventrodorsal abdominal radiograph of the same bitch as in Figure 2, centred on the kidneys five minutes after completing the intravenous contrast injection. Both kidneys, the renal pelvis (X) and the ureters can be identified. The ureters (U) often appear as broken lines, which is due to the ureteral peristaltic waves. The urinary bladder (B) can be seen, but no conclusions can be drawn about the presence or otherwise of any pathology.

URINATION and urinary con- tinence in normal, healthy dogs requires coordinated action of the urinary bladder and ure- thral sphincter.

During urine storage in the bladder, the detrusor muscle in the bladder wall relaxes, which allows urine to accumulate while maintaining a relatively low intra- vesical pressure.

As the bladder continues to distend further, the bladder wall stretch receptors are activated and this stimulates the detrusor reflex via the parasympathetic nervous system, which results in bladder contraction.

Urethral relaxation must also occur simultaneously to allow urine voiding, and this occurs via inhibition of the sympathetic nerv- ous system and somatic nervous system (pudendal nerve), which innervate the smooth muscle fibres (internal sphincter) and striped muscle fibres (external sphincter) respectively. There is also voluntary control over urination, both central and via somatic innervation.

Urinary incontinence may be neurogenic or non-neurogenic in origin (Brown, 2003). This article will focus on the diagnosis and treatment of the non-neu- rogenic causes of incontinence.

Urinary incontinence is a common problem in dogs, par- ticularly in bitches, and may occur at night or when the animal is lying down. This is particularly in bitches, and may occur at night or when the animal is lying down.

Incontinence should also be assessed because urinary incontinence will worsen with weight gain and subsequent intra-abdominal fat deposition.

Serum biochemistry. This can help to eliminate other diseases that may be mistaken for urinary incontinence (such as renal failure or diabetes mel- litus-causing PU/PD).

Urinary and urine bacte- rial culture and sensitivity. This is an important part of any urinary investigation, particularly because UTIs are not uncommon in animals with incontinence – either as a primary cause or as a complicating fac- tor. It is particularly important to recognise and institute appro- priate therapy where surgery may be required. Urine samples should be taken via cystosente- sio or aseptic catheter collection; free-catch urine will not yield reliable results. Common UTI causes include Staphylococ- cus, Streptococcus, Enterococ- cus, Escherichia coli, Proteus, Pseudomonas, Klebsiella and Enterobacter. A 14-day course of antibiotics should be based on sensitivity results. Ideally, a repeat culture should be per- formed seven to 14 days after completion of the treatment, but some UTIs may require up to six weeks of antibiotics.

Incontinence persists despite the exclusion of UTIs or other systemic illnesses, or if UTIs recur, the next stage is to per- form the following investigations.

Urinary tract contrast stud- ies. These are performed under general anaesthesia. Before induction, it is important to administer an enema to ensure that the colon is empty, as the presence of faeces may obscure the detail of the studies.

Initially, orthogonal plain radi- ographs are taken of the abdo- men to provide control films prior to contrast radiography. This will also provide the opportu- nity for identification of organ size, position and shape, as well as rule out neoplasia or urolith- ogenesis (Figure 2).

The urinary bladder is aspec- tically catheterised and urine is collected into a sterile plastic tube for sediment analysis and bacte- rial culture and sensitivity. It is particularly important to confirm the absence of urinary infection before any surgery is considered.

Negative contrast (pyelocaliceal system). A moderate amount of air (such as 1.0ml/ kg) is injected into the bladder via the urinary catheter, which will allow good definition and contrast of the bladder with the surrounding soft tissue and posi- tive contrast.

An intravenous urogram (IVU). This involves rapid intra- venous injection of a water soluble iodine-based contrast medium (the authors use 1.2ml/ kg of iohexol, Omnipaque 350 mg/ml). Immediately after injection is complete, a nephro- gram can be obtained (Figure 3) and, after five minutes, the renal pelvis and ureters can be identified (Figure 4), although these timings may vary between individuals. Ten minutes after contrast injection, a right lat- eral radiograph centred on the umbilicus will allow assessment of the distal ureters (Figures 5 and 6) and, with the use of fluoroscopy, the peristaltic waves along the ureters may be followed until they open into the urinary bladder (or other- wise). Some institutions image the contrast at this stage using computed tomography (CT).

When performing an IVU, it is important to monitor the early radiographs. Failure to identify a nephrogram suggests acute renal failure, which is very rare and readily corrected with prompt, aggressive, intravenous fluid therapy. For this reason, the authors prefer to maintain anesth- etised patients on fluid therapy throughout the procedure and find that frusemide is very rarely indicated. Agressive reaction to the contrast medium has also been reported, particularly in humans, but is extremely rare in dogs. These rare complications should be discussed with the owners prior to injecting the test substance.

Finally, a retrograde positive- contrast vaginourethrocysto- gram or urethrocytogram is performed (the authors use 1ml/kg of Urografin 150 or Omnipaque 350 mg/ ml diluted in the same volume of water for injection). A Foley urinary catheter is inserted just into the entrance of the vagina or urethra and the bulb inflated with air so the contrast medium cannot leak normo- grade (Figure 7). The vulva is also clamped to prevent leakage of contrast. This study will allow identification of the neck of the bladder and will highlight any fill- ing defects in the urethra (which may be suggestive of a urethral, inflammation or neoplasia). If any ectopic or hydroureters are present, retrograde filling of the ureter is also commonly seen (Figure 8).

Urography allows directed visual- isation of the ureters (Figure 10) and can identify ectopic ureters (Figure 11) or bladder wall masses (and will permit visualisation of a biopsy).

The most common anatom-
The cause of urinary incontinence (particularly in juvenile dogs) is an ectopic ureter(s), which can be associated with intermittent or continuous urinary incontinence, depending on the degree of retrograde bladder filling. This is seen more commonly in females, possibly because of their shorter and wider urethra (Holt, 1990; Holt, 1995). Breed predispositions have been identified and include the golden retriever, the Labrador retriever and the Skye terrier (Holt, 1995; McLoughlin, 2003). In a retrospective study of 175 dogs with ureteral ectopia (Holt, 1995), nearly 70 per cent had other additional urinary tract abnormalities (such as bladder hypoplasia and intrapelvic bladder neck), which emphasises the importance of performing a thorough diagnostic workup in cases of urinary incontinence.

Another commonly seen anatomical abnormality is an intrapelvic bladder neck and short urethra (Figure 8), which is often seen in association with urethral sphincter mechanism incompetence (Holt, 1985). As urethral pressure profilometry is not performed routinely in clinical cases, the diagnosis of urethral sphincter mechanism incompetence is mainly by exclusion of other diagnoses. Treatment options for non-neurogenic urinary incontinence will be outlined in a future article.

References and further reading

KELLY BOWLT qualified from the University of Edinburgh in 2005 and spent two years in small animal practice in Nottinghamshire and one year as a junior clinical training scholar at the RVC. In 2008, she began an ECVS-approved residency in small animal surgery at the University of Bristol, where her interests include all aspects of soft tissue surgery, particularly reconstructive surgery and management of the trauma patient.

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