Diagnosis and Management of Urinary Incontinence

Christopher A. Adin. DVM, DACVS
University of Florida, Department of Small Animal Clinical Sciences
Gainesville, FL 32610.

Presented at the University of Florida College of Veterinary Medicine 8th Annual Dog Owners & Breeders Symposium on July 31, 2004. Courtesy of the AKC's Canine Health Foundation.

Key points

Urinary incontinence is a common problem, occurring with an incidence of 10-20% of female dogs after ovariohysterectomy.

Complete diagnostic evaluation of urinary incontinence involves imaging studies to rule out anatomic abnormalities and functional studies to rule out sphincter mechanism incompetence.

Medical therapy with alpha adrenergic agonists is successful in approximately 70% of dogs with urinary incontinence.

Current methods for surgical therapy are highly successful in the short term, but long-term success has been unsatisfactory.

Introduction

Urinary incontinence occurs with alarming frequency in dogs, particularly in spayed females. Retrospective studies have reported that the incidence of urinary incontinence in dogs following ovariohysterectomy ranges from 13.6% to 20.1%. The significance of urinary incontinence in an indoor pet cannot be underestimated, as the problem can often lead to euthanasia due to repeated house soiling. Thus, urinary incontinence is a common problem with serious consequences; it is our responsibility as veterinarians to be familiar with its diagnosis and treatment.

Causes for urinary incontinence may be divided into two categories: anatomical abnormalities and functional abnormalities. The anatomical abnormality that is most often associated with urinary incontinence is ureteral ectopia. Suspicion of ectopic ureter is highly dependent upon history and physical examination of the animal, as this problem occurs almost exclusively in female dogs and is characterized by constant dribbling of urine since birth. Functional abnormalities causing urinary incontinence may be congenital or acquired, but most commonly involve urethral sphincter mechanism incompetence (USMI), otherwise known as "hormone responsive incontinence". In contrast to ureteral ectopia, USMI typically occurs in middle-aged spayed female dogs and is characterized by intermittent incontinence during recumbency and sleep. Other

factors such as polyuria/polydipsia, urinary tract infections and vaginal strictures can exacerbate pre-existing incontinence, but in my opinion, are rarely primary causes.

One purportedly simple method of diagnosing USMI is by response to treatment (typically with phenylpropanolamine, see later section). This method is not as simple as it seems, because a lack of response to treatment does not rule out USMI- up to 30% of dogs do not respond to pharmacologic therapy. In addition, many dogs require dosage adjustments and up to 4 weeks of drug therapy before a response is noted. Due to these issues, I believe that it is preferable to perform a proper diagnostic evaluation before pursuing therapy.

Diagnostic evaluation of urinary incontinence is focused primarily on identifying these anatomical or functional anomalies. Anatomic abnormalities may be identified through a number of imaging techniques. Initial screening examination is typically performed by use of survey radiography or abdominal ultrasonography. Abdominal ultrasound findings consistent with ureteral ectopia include hydronephrosis or hydroureter on the affected side. In chronic cases, parenchymal and renal pelvic changes may be suggestive of pyelonephritis. Intravenous contrast urography is the classic method for identification of ectopic ureters. However, the technique is time consuming and can be difficult to interpret. We have switched to the use of computerized tomography (CT) after intravenous contrast administration. This technique is less labor intensive than performing staged radiographs, does not require removal of feces from the colon and allows specific localization of the entry point of ectopic ureters. Disadvantages of CT excretory urography are that it has limited availability, adds to client expense and requires general anesthesia. A final method for definitive identification of ectopic ureters is direct visualization via cystoscopic evaluation. This technique is considered the “gold standard” and has high sensitivity and specificity, but requires expensive equipment and a high skill level to obtain a complete examination of the urinary tract.

If anatomic abnormalities are ruled out, functional evaluation of the continence mechanism may be performed. Urethral pressure profilometry (UPP) is a method for quantification of the pressure exerted by the urethra as a catheter is placed into the bladder and slowly withdrawn out of the urethra. Urinary continence is dependent upon maintenance of a maximal urethral pressure that exceeds intravesicular pressure, thereby resisting the leakage of urine. Documentation of decreased maximal urethral pressure remains one of the few methods to objectively diagnose USMI in dogs. Unfortunately, equipment for performing UPP is expensive ($10,000 to $25,000) and results vary depending upon the position of the animal, size of the catheter used, speed of withdrawal, rate of fluid infusion and the use of sedatives or analgesics. Another technique related to UPP may correlate more closely with clinical incontinence by evaluating the entire continence mechanism. This test, called leak point pressure, involves placement of a catheter into the bladder or rectum to allow measurement of the intravesicular or intraabdominal pressure. The abdomen may then be compressed until leakage occurs from the vulva. The pressure at which leakage occurs is termed leak point pressure. Currently, these urodynamic tests are performed only in large referral institutions and the

value of their application in practice is limited by difficulties in standardizing results between institutions.

The pathophysiology of USMI in spayed female dogs has been the focus of many research studies, though it remains controversial. Two mechanisms are likely to contribute to incontinence after ovariohysterectomy. One factor that has been implicated is caudal movement of the urogenital tract that occurs after ovariohysterectomy. The normal position of the bladder and proximal urethra is intra-abdominal so that increased abdominal pressure causes compression of both the bladder and urethra, preventing urine leakage. If the bladder moves caudally, the urethra may enter the pelvic canal (pelvic bladder) and intra-abdominal pressure will be transferred only to the bladder, predisposing to urine leakage. A second contributing factor may be the hormonal changes that occur after ovariectomy. Estrogen is thought to sensitize the smooth muscle of the proximal urethra to the effects of catecholamines, increasing urethral tone. Certainly, many dogs improve when treated with estrogen replacement. However, spayed dogs with USMI have similar estrogen levels to spayed dogs without USMI and hormone replacement is not 100% effective in curing incontinence in all dogs. Thus, a combination of predisposing anatomical and hormonal factors may contribute to USMI after ovariohysterectomy.

Pharmacologic therapy is the mainstay for treatment of urinary incontinence in dogs. The most commonly used agent is the alpha agonist phenylpropanolamine or PPA. This drug has an efficacy of approximately 70% in resolving urinary incontinence due to USMI in female dogs. Side effects of restlessness and anorexia are somewhat predictable for a sympathomimetic drug and are dose related. The effects of life-long administration of PPA have not been evaluated and the drug has not been consistently available. Despite these issues, PPA is currently the first line therapy for USMI in dogs due to its efficacy and minimal side effects.

Estrogenic compounds have also been demonstrated to have some efficacy in the treatment of USMI. Unfortunately, estrogens are associated with a low rate of serious side effects, such as prolonged bone marrow suppression, endocrine dermatopathies and reproductive disorders. Due to these side effects, Estrogen is not typically used unless a dog has proven non-responsive to PPA therapy, or PPA is not available.

Tips for pharmacologic therapy:

I begin with PPA at a dose of 1mg/kg BID

In dogs that are refractory to initial dose of PPA, I increase the dose to 1mg/kg TID
In dogs that do not respond to PPA given three times per day, estrogenic compounds (Diethylstilbesterone) may be used in combination with PPA and may have synergistic effects.

Surgical intervention is an option in dogs that fail to respond to pharmacological therapy. Techniques described in dogs with USMI are similar to those used in human beings and have accomplished static resistance to urine leakage by altering the anatomic position of the bladder neck and pelvic urethra, by urethral bulking, or through urethral sling procedures. The most commonly used surgical technique, colposuspension, was adapted from a technique used in women with hypermobility of the urogenital tract. Sutures are placed into the vaginal wall through a caudal midline abdominal approach and are passed cranially and ventrally around the prepubic tendon, pulling the urogenital tract into the abdomen. Though colposuspension has good short-term efficacy, surgery alone has produced poor long-term results, with restoration of continence in only 14-56% of dogs in large clinical studies. Many dogs that do not respond to surgery will benefit from continued administration of PPA.

Summary

Urinary incontinence is a common and serious problem in dogs. Primary rule outs include ectopic ureter and urethral sphincter mechanism incompetence. Diagnostic evaluation should include both imaging and functional studies. Pharmacologic therapy is successful in the majority of dogs and surgery is only offered in cases that are refractory to phenylpropanolamine. Surgery is simple to perform and has a high initial success rate, but incontinence will often recur within the first year.