

Session 3:

Update on Urinary Incontinence in Female Dogs

Introduction

Urinary incontinence is a common problem affecting up to 20% of neutered female dogs and 30% of those weighing more than 20 kg. In most of these patients it occurs within 3 years of neutering, although in many it may not become a major problem until later in life when it can be complicated by diseases that increase water intake and urine production. There are several reasons for urinary incontinence, including ureteral ectopia and detrusor hyperreflexia (over-active bladder), but the most common in the dog is urethral sphincter mechanism incompetence (USMI).^{1,2}

Etiology

The relationship of hormone status to incontinence has long been recognized. Estrogen receptors are found in the urethral mucosa, vasculature, and the smooth and striated muscles of the urethra. The supporting ligaments and vaginal walls also have estrogen receptors. Estrogen appears to have a trophic effect on all of these areas. Decreased estrogen levels are associated with loss of urethral muscle tone, urethral vascular atrophy, and decreased glandular secretions, affecting major components of the continence mechanism. It is expected that decreased estrogen levels are a factor in the development of incontinence in dogs, however the lack of clinically recognized incontinence in anestrus intact females points to a more complex mechanism than simple lack of trophic effect. Some evidence suggests the concomitant increase in LH and FSH associated with estrogen (and testosterone in males after neutering) decrease may also play a role in the development of incontinence in dogs, although the mechanism has yet to be determined.¹

Other factors evaluated for risk of incontinence are breed, body weight, and tail docking. Among the breeds found to be at increased risk for urinary incontinence are Old English Sheepdogs, Dobermans, German Shepherd Dogs, Boxers, Weimaraners, Rottweilers, and Irish Setters. Interestingly, of the breeds evaluated, Labrador Retrievers appeared to have a decreased risk of incontinence, particularly among large breed dogs. Large and giant breed dogs, and dogs weighing over 20 kg, have been found to have a significantly increased risk of developing incontinence, while small breed dogs have a decreased risk. Tail docking has been suspected to be a contributor to the onset of incontinence since the muscles attached to the tail base, such as the levator ani and coccygeus muscle, are often implicated in the development of the disorder in women. No studies have been able to directly relate tail docking to incontinence, however. It is noted that among the breeds with increased risk of incontinence, tail docking is common, however, many females are docked as newborns and develop the disorder only after they are neutered, sometimes as older adults.

There is much discussion regarding the role of neutering in the risk of incontinence. While the association is no longer in debate, the relationship of the timing of the procedure to incontinence is controversial. Several studies have implied a decreased risk of incontinence if neuter

occurred prior to the first estrus. A recent study by the author demonstrated an increased risk of urinary incontinence with earlier neutering, which became more significant the larger the dog.³

Diagnosis

A careful history must be taken when discussing incontinence with pet owners. It must be distinguished from behavioral problems, polyuria, or pollakiuria, and it is important to establish that the animal is unconscious of the passage of urine. The age of onset of the incontinence is important to establish in young dogs, to determine the potential for ureteral ectopia. Breeds such as Soft-coated wheaten terriers, Labrador retrievers, Siberian husky, Golden retriever, Newfoundland, and English bulldog have an increased incidence of ectopic ureters. Dogs with ectopic ureters often have urinary incontinence symptoms which start prior to neutering, although this may be misinterpreted as poor housetraining by the owners. A small number of dogs with ectopic ureters may not have significant incontinence until after neutering, so later onset does not rule out the possibility of a congenital malformation. Dogs with early onset of clinical signs should be evaluated for ectopic ureters, particularly if they show little or no response to medical therapy.

Patients whose incontinence has developed along with an increase in water intake should be further evaluated for disorders causing polyuria and polydipsia. All patients with urinary incontinence should receive a urinalysis with sediment examination and a urine culture. While the leakage of urine may be exacerbated by a urinary tract infection, the incontinence itself may predispose the patient to a UTI. Bloodwork is indicated if the patient has decreased urine concentration, particularly in the face of dehydration.

Treatment

Medical Treatment of USMI

Medical therapy of USMI is generally considered the first line of management; only after failure or intolerance of medical therapy are surgical options considered. Medical treatment of USMI in the neutered female dog consists of increasing number and sensitivity of α -receptors in the urethral sphincter with estrogen, or by stimulating those receptors with an α -agonist.

Provided no additional abnormalities are noted in physical examination, urination, or laboratory evaluation up to this point, most experts would agree that in an otherwise healthy spayed female dog a tentative diagnosis of USMI can be made and, empirical medical treatment is acceptable. Response to therapy with estrogen compounds or phenylpropanolamine may confirm the diagnosis of USMI as a primary problem, although other lower urinary tract disease may also exist.

The most commonly used estrogens are diethylstilbesterol (DES) and estriol. DES is not available commercially so it must be compounded. Adverse effects associated with estrogen use include mammary gland development, vulvar swelling, and attractiveness to males. These are usually dose-related and mild, and subside with dose-reduction. A more serious adverse event associated with estrogen use is irreversible bone marrow suppression. Some clinicians may want to monitor the complete blood count in animals receiving estrogen compounds, however the doses most associated with bone marrow suppression are more than 10 times higher than those recommended to treat USMI. Performing a complete blood count before starting treatment with an estrogen compound, and then rechecking it one month into treatment can alleviate concerns.^{4,5,6}

Phenylpropanolamine (PPA) is the most widely used α -agonist for the treatment of USMI. It is commercially available in sizes designed for use in dogs. The dose and frequency needed for each animal tends to vary widely and may need to be increased over time to maintain continence. Adverse effects associated with PPA include restlessness, aggression, changes in sleeping patterns, and gastrointestinal signs. These are also usually alleviated by a reduction in dose or frequency.⁷ Care must be taken when prescribing PPA in patients with concurrent disease that can predispose to hypertension and systolic blood pressure should be monitored after dose increases. Clinical response to PPA administration ranges from 75% - 90%.^{7,8} Frequently both an estrogen and PPA are used in the same patient for severe or refractory incontinence. There is little evidence supporting a synergistic increase in efficacy, however, there are anecdotal reports of greater improvement than on a single medication regimen.

Dogs who are not responding to appropriate medical therapy should be evaluated for other lower urinary tract disease via imaging including abdominal ultrasound and/or contrast radiography. We routinely perform cystoscopy in patients with urinary incontinence to rule out anatomic abnormalities which may be contributing to clinical signs. Urodynamic evaluation can be performed to rule out over-active bladder and confirm the diagnosis of USMI

Surgical Treatment of USMI

Surgical therapy of urinary incontinence has traditionally focused on increasing the transmission of intraabdominal pressure to the proximal urethra and improving the stability and pressure within the urethra. Colposuspension, which attaches the uterine remnant to the pelvic ligament and thus draws the bladder neck and proximal urethra further into the abdomen, has been found to have variable success and has a high failure rate due to breakdown of the attachment to the pelvic ligament.

Injectable urethral bulking agents have been used, particularly bovine cross-linked collagen, to increase resting urethral pressure in dogs with USMI. Although many materials have been investigated, the theory behind all injectable bulking agents is to narrow the diameter of the urethral lumen, thus creating outflow obstruction, increasing stretch in sphincter muscle fibers, and allowing the urethral sphincter to close more effectively. The material is injected submucosally into the proximal urethra via cystoscopy. Based on two long-term reviews, post procedure continence in female dogs with urethral incompetence was 66 – 68% and of those who are not continent, 46 – 60% achieved continence with the addition of medical therapy.⁹ The

largest drawback of this procedure is the variability in duration of effect. Median duration of continence without additional medical therapy ranged from 8 months to 2 years.

A newer procedure for canine urinary incontinence is gaining in popularity and availability. The surgical placement of an artificial adjustable hydraulic urethral sphincter around the urethra has been studied in female dogs and anecdotally used in males. The device allows the dog to urinate normally while maintaining continence. Continence was maintained for up to 2 years in 4/4 dogs. A recent review of 27 dogs had significantly improved continence scores after placement of the sphincter with only 2 dogs having complications involving partial urethral obstruction.¹⁰ A small port is connected subcutaneously to the sphincter cuff and may be adjusted by injection of saline to tighten the sphincter. Anecdotally, many dogs have not needed addition of saline to the port post-operatively, since the placement of the sphincter itself appears to provide enough support and occlusion to the urethra to maintain continence. This procedure provides a more reliable option to colposuspension for those patients who fail medical therapy.

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