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Case Report
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Treatment of lower back pain to resolve symptoms of canine urethral sphincter mechanism incontinence

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ABSTRACT

Background: We report on a 16-month-old, spayed female miniature poodle diagnosed with urethral sphincter mechanism incontinence (USMI), refractory to common treatment regimes. This dog was examined by multiple veterinarians and underwent extensive testing, including blood work, urinalysis, urine culture and sensitivity, ultrasound, cystoscopy, and contrast abdominal computed tomography to confirm this diagnosis. Failure to respond to pharmaceutical intervention led to the recommendation of placement of a urethral hydraulic occluder. Instead of pursuing a surgical intervention, the owner elected to consult a veterinary sports medicine and rehabilitation specialist (VSMR).

Case description: At the time of VSMR assessment, the patient had been incontinent for 14 weeks, despite receiving the maximal doses of phenylpropanolamine and estriol. The VSMR diagnosed lower back pain (LBP) and treated the patient accordingly with manual therapy, acupuncture, and photobiomodulation. The patient was treated twice, 2 weeks apart, becoming continent within 2 days of treatment. Medications were gradually discontinued over 4.5 months after the first VSMR visit, and the patient remained continent 644 of 648 days (99.4%) after the discontinuation of all medications.

Conclusion: Although a relationship between canine USMI and LBP has already been drawn, this is the first published report of a patient who received a comprehensive workup to diagnose USMI, failed to respond to months of pharmaceutical therapy, but rapidly responded to treatment of LBP, thus avoiding a surgical intervention. This case report demonstrates the importance of early assessment of patients with canine USMI for LBP by a qualified specialist. Testing for LBP as part of the diagnostic assessment of urinary incontinence, and treating it when found, may prevent the need for pharmaceutical intervention and/or expensive diagnostics that owners may be unable to pursue, leading to relinquishment or euthanasia of dogs with USMI.

Keywords: Urethral sphincter mechanism incontinence; Lower back pain; Photobiomodulation; Incontinence.

Introduction

A 16-month-old, spayed female, 5.9 kg, miniature poodle was presented with a complaint of sudden onset urinary incontinence when in a relaxed recumbent state. She was spayed at 7.5 months of age, was current on all recommended vaccinations, was treated monthly with milbemycin oxime/praziquantel, and every 3 months with fluralaner. She had no other health issues.

The patient had been playing fetch the previous day. After resting that evening and upon waking the following morning, the owner noted a large urine-soaked area where the patient had been lying, and her hind legs and abdomen were wet with urine. There were no abnormal findings on the physical examination of the patient.

Case Details

The initial urinalysis, collected by cystocentesis, showed small amounts of RBCs and WBCs – no crystals or bacteria (SG 1.038, pH 6.0, LEU/PRO/GLU/KET neg, UBG 1 mg/dl, BIL 1 mg/dl, BLD 250 Ery/ul; SeddiVue WBC 19/HPF, RBC >50/HPF). Assuming a urinary tract infection, the patient was prescribed amoxicillin 50 mg/clavulanic acid 12.5 mg BID for 7 days, while awaiting urine culture and sensitivity results. The results, 5 days later, showed *Enterococcus faecalis* 5–10×10E4 CFU/ml, which was susceptible to all antibiotics tested. Since there was no clinical improvement, the antibiotic was changed to Enrofloxacin 75 mg semel in die (SID) for 8 days.

Incontinence persisted so repeat urinalysis, bloodwork, a neurologic exam, and vaginal exam were conducted 7 days after the initial visit. Bloodwork showed only

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a slight increase in neutrophils attributed to stress. There were no neurologic, muscular, or anatomic abnormalities found. Urinalysis results were similar to the previous findings (WBC 13/hpf *vs*. 19 on the 20th; SG 1.021 *vs*. 1.038; pH 7 *vs*. 6). The patient was treated for presumptive urethral sphincter mechanism incompetency (USMI) with phenylpropanolamine 50 mg/ml 0.25 ml BID (25 mg/day) starting 14 days after the onset of incontinence.

Because of her young age and continued incontinence, the patient was referred to a veterinary internal medicine specialist (IMS) for further work-up. The initial IMS visit took place 25 days after the onset of incontinence. Differential diagnoses included USMI, urinary tract infection, ectopic ureters, paramesonephric remnant, patent urachus, vaginal abnormalities (vestibulovaginal constriction, vaginal bands, and rectal/vaginal-urethral fistula), infiltrative urinary bladder disease (cystitis, neoplasia, urolithiasis), congenital urinary bladder hypoplasia, detrusor instability (urge incontinence), neurological (lower motor neuron disease, upper motor neuron disease, brain stem lesions, detrusor atony, detrusor-urethral dyssynergia), and urethral obstruction.

The general physical examination revealed a mildly recessed vulva. Urinalysis, urine culture, and sensitivity were repeated, with no abnormal findings. An abdominal ultrasound was performed to check for structural abnormalities, uroliths, or evidence of an inflammatory process. No abnormalities were seen. It was decided to continue treatment for presumptive USMI.

After 23 days of treatment with phenylpropanolamine, the patient was still incontinent 48% of the days (11 of 23 days). Thus, diethylstilbestrol (DES) 1 mg SID was added to the treatment regimen. DES was chosen because estriol was not available in Canada. During 14 days of the phenylpropanolamine/DES regime, the patient was incontinent 43% of the time.

Because of poor clinical response, a cystoscopic evaluation, under anesthesia, was performed on day 43 post-onset of incontinence to rule out ectopic ureters. There were no abnormal findings.

Estriol was compounded and substituted for DES on day 58 post-onset of incontinence. The new regimen was phenylpropanolamine 12.5 mg BID (25 mg/day) and estriol 2 mg SID. On day 64 post-onset, the owner was instructed to give the phenylpropanolamine TID at a dose of 0.2 ml (30 mg/day); on day 80 post-onset, to further increase the phenylpropanolamine to 0.25 ml TID (37.5 mg/day). On day 78 post-onset, the owner was additionally instructed to give the patient a herb and isoflavone supplement (VetriSCIENCE Bladder Strength) ½ tablet SID.

Because the patient was still experiencing incontinence on this modified pharmaceutical protocol, a contrast abdominal computed tomography, under general anesthetic, was performed to look for fistulae or ectopic ureters not seen on cystoscopy. No abnormalities were found.

The owner reported that the patient was "acting like an old dog", citing depression and decreased play behaviour on the phenylpropanolamine and estriol regimen.

The next step recommended by the IMS was to consult with a veterinary surgeon for urethral hydraulic occluder placement. The owner was reluctant to proceed with occluder surgery, so it was suggested to take the patient to a veterinary sports medicine and rehabilitation (VSMR) for consultation.

The first visit with the VSMR was 99 days after the onset of incontinence. At this point, the patient had a 23% incontinency rate on combined therapy (phenylpropanolamine, plus DES or estriol) (14 of 61 days).

The VSMR performed a neuromusculoskeletal examination, with all detected abnormal findings confined to the lumbar spine, including reduced vertebral mobility, hypertonic epaxial musculature, and myofascial trigger points (mfTPs) affecting the left psoas major muscle. Based on these findings, a diagnosis of LBP was made.

Treatment consisted of manual therapy (both mobilizations and manipulations), placement of acupuncture needles in acupoints (K13, ST36, GB34, LI10, GV8,4,2, BL60,25,23,21,20,19), as well as therapeutic photobiomodulation (500 mW continuous wave, 810 nm, 20 J/cm^2 at skin surface).

The patient had incontinence on the second and third days post-treatment, and no further episodes until her second appointment with the VSMR for follow-up and adjustment, 14 days later. At that time, the owner noted that the patient was demonstrating increased voluntary stretching behaviour and improved comfort when riding in the car. Furthermore, the patient had returned to jumping on the bed, something she had not been able to do for some time.

Physical examination findings demonstrated substantial improvement relative to the original presentation; normal lumbar mobility, but MfTP of the iliocostalis muscle bilaterally. No manual therapy was performed. Acupuncture needles were placed in BL23 and ST36, and photobiomodulation therapy was repeated.

After seeing the VSMR for the first time, the medications were gradually reduced until estriol and phenylpropanolamine were totally discontinued 4.5 months after the first VSMR treatment. 332 days after the time of discontinuation of estriol and phenylpropanolamine, the patient was dry 99.7% of the time (331 of 332 days; wet on day 163). The owner reported that the patient's temperament and actions returned to those of a puppy once the medications were discontinued.

The patient had recurrence of incontinence on days 333, 335, and 337. The owner reported that the patient vigorously played fetch before these

episodes. She was reassessed by the VSMR on day 345 after the completion of all medication. Physical examination findings were similar to the original presentation – reduced vertebral mobility, hypertonic epaxial musculature, and mfTPs affecting the right lumbar epaxial and left psoas major muscles. Treatment consisted of manual therapy (both mobilizations and manipulations), placement of acupuncture needles in acupoints (KI3, ST36, GB34, LI10, GV8,4,2, BL60,25,23,21,20,19), therapeutic photobiomodulation (500 mW continuous wave, 810 nm, 20 J/cm^2 at skin surface), and the placement of acupuncture needles directly into mfTPs. The patient has had no relapses in the 296 days since the last visit to the VSMR

In summary, the patient has been continent 99.4% percent of the time (644 of 648 days) after VSVMR treatment and being completely removed from the phenylpropanolamine and DES/estriol medications.

Discussion

USMI is common in dogs, affecting 5% of spayed females, and 1% of males of intact females (Colt *et al*., 2008) and often leads to the relinquishment or euthanasia of dogs (Applegate *et al*., 2018). A relationship between LBP and USMI has been suggested (Lane and Hill, 2022), with 74% of incontinent patients showing clinical improvement following treatment of LBP. However, this study was retrospective, evaluating patients who presented with a history of urinary incontinence while sleeping, and the diagnosis was presumptive based solely on the clinical history, as diagnostic test results such as urinalysis or imaging were frequently unavailable. Conversely, this patient received extensive testing to confirm a diagnosis of USMI prior to VSMR referral.

This report is further evidence that treatment of LBP can eliminate USMI incontinence and, by corollary, that USMI should be should be considered a potential indicator of pain.

Conclusion

We recommend that palpation for LBP be part of every diagnostic workup for patients displaying incontinence while sleeping. If LBP is present, it should be treated with combined acupuncture, manual therapy, and photobiomodulation before concluding that lifelong medication or advanced diagnostic techniques such as cystoscopy are required. Addressing LBP can improve quality of life, regardless of its effects on incontinence, but as this case report shows, it may resolve incontinence, which in turn may reduce the relinquishment or euthanasia of dogs with uncontrolled USMI.

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None reported

Conflict of interest

The authors declare that there is no conflict of interest.

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Authors' contributions

Both authors contributed equally to this report.

Data availability

All data supporting the findings of this study are available within the manuscript. More details of diagnostic testing results are available upon request.

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