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A case of polydipsia and inappropriate urination in a mongrel dog

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Abstract: A 10-year-old mongrel castrated male dog, weighting 16 Kg, was examined for polydipsia and inappropriate urination.

Polydipsia occurred at stressing events / periods or for apparent boredom, while inappropriate urination occurred even without clear external stimulation, in various areas of the home and at different times of the day and week.

The laboratory and ultrasound findings allowed to exclude a medical cause. The diminishing of polydipsia following behavioral interventions, allowed to diagnosticate a psychogenic polydipsia.

It was explained to the owners that the dog should not be punished when he carries out the undesirable behavior. It should rather identify when the dog is going to drink in order to anticipate and involved him in other activities The owner was instructed to prevent the stressful and conflict situations. A food supplement based on L-theanine (Anxitane®) for one month (4.5 mg/Kg BID for the first 7 days then 3 mg / Kg BID) was recommended.

Two weeks after the first visit and during the following months, there were no more episodes of polydipsia, so the water restriction program was not undertaken.

During this period, two episodes of excitement/emotional urination took place. It was decided to associate with Anxitane®, Adaptil® collar for one month.

Four months after the visit the owner reported that the dog apparently had less control over the urinary sphincter. To date, the dog is not following any nutraceutical or pharmacological treatment, and the situation is under control (two, three episodes per month)

Key Words: dog, polydipsia, inappropriate urination

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Presentation

A 10-year-old mongrel castrated male dog, weighting 16 Kg, was examined for polydipsia and inappropriate urination.

Polydipsia occurred during stressing events / periods or because of apparent boredom, while inappropriate urination occurred even without clear external stimulation, in various areas of the home and at different times of the day and week. Both problems were cyclical.

History and presenting signs

The dog was found on a beach at the age of 7 months, approximately. No information was available on the behavior of parents and siblings, on the age of weaning, nor on the type of stimulation (people, other animals, places and situations) that he faced in the period prior to adoption.

The dog lived with the two owners (both workers: one full-time and one part-time) and a

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castrated male cat of 13 years (already present in the house upon arrival of the dog) in a large apartment with a terrace; he had full access to the rooms and the terrace in the presence of the owners.

He had an excellent relationship with both owners and the relationship with the cat had always been friendly. On weekdays, the dog stayed alone at home in the morning; on the weekend both owners were present.

The dog ate dry food, twice a day, at set times and homemade products (lettuce, carrots, bread) as a snack between meals. The appetite was always voracious and indiscriminate.

During stressful periods the water intake increased, leading to the consumption of 100-150 ml/kg/day; vice versa, in periods of remission, the daily intake corresponded to the needs of species, and did not exceed 80 ml/kg /day (Nelson, 2015).

The owner reported that the main trigger for the polydipsia was the arrival of guests, especially if numerous, moreover, the behavior seemed to be related to boredom.

About strangers, the dog assumed, at first, avoidance behaviors (moving backwards/away, looking away), displacement behavior (licking the truffle, yawning, chewing empty) (Landsberg et al., 2013d) and exhibited a tense posture (low head, backward ears, tail perpendicular to the floor). These manifestations were accentuated if the stranger approached abruptly the dog from above to pet him. This approach always caused an overreaction with snap of the head downwards, "whale eye" and muscle stiffness. Conversely, if they proposed themselves calmly and politely, using a calm tone of voice and avoiding imposing approaches, the dog was disposable to interaction and sometimes required pampering and attention, without, however, relaxing: the mouth, for example, always remained closed.

The dog usually urinated and defecated outdoors during walks (three times a day). The exploratory behavior was proportionate to the environmental stimulations. When he started to urinate at home too, it was evident an increase in daily frequency and volume and a change in the urinary behavior: sometimes the dog assumed a low and static posture and looked at the owners with a worried expression; at other times, it seemed that he was not able to hold the urine and that he lose it while he was walking, leaving a "trail" behind him.

A typical situation that frequently resulted in inappropriate urination consisted in trying to interact with both owners, who, however, were engaged in different activities; after having looked insistently at the owners, the dog exhibited an a-finalistic motor activity (mostly pacing) and, at the same time, unintentional urination. Inappropriate urination occurred both in the presence and in the absence of the owners but was more frequent in their presence.

Polydipsia always occurred in conjunction with inappropriate urination, which also occurred alone. Both symptoms followed an intermittent course since the dog was one year old, but at the time of the visit, critical periods were not distinguishable from normal ones.

If the dog exhibited these undesirable behaviors, the owners ignored or distracted him.

The dog showed regular self-grooming and occasionally licked his limbs for short time without lesions of any kind. He slept in different areas of the house, including the owners' bedroom, and regularly used a confined rest area where he went spontaneously and willingly and at the request of the owners.

The dog showed little interest in the play in general and towards objects, preferring short physical interactions with the owners. Aggressive behavior was exhibited, in the form of barks, only when he met other dogs.

The medical history included regular vaccination and parasiticidal prophylaxis. For about 4 years, the dog had modest tenderness in the hind limbs, which was detectable only during palpation; for this reason, he cyclically took an integrator that supports joint function (NBF LANES Artikrill®).

The dog was castrated at the age of one year and a half, attempting to reduce the inappropriate urination but without success. It was thus decided to undertake a drug therapy based on

clomipramine: this second intervention also did not produce the desired results (the owner also reported that he had not identified any side effects). The drug intake was suspended shortly after the beginning of a behavior modification course; during this time, inappropriate urination and polydipsia were in remission and the dog trainer focused only on the problem of barks. In the following years, the main problem came back with the same cyclical trend and an attempt was made to keep it under control by using numerous complementary feeds, with no noteworthy results.

Examination and laboratory exams

The physical examination was conducted in the veterinary clinic where the dog owner worked.

The dog was in good health condition and his BCS was estimated 6/9.

At the same time a behavioral observation was conducted: the dog was shy, wary and hesitant.

He was circumspect towards social stimuli and not being able to copy with them, he maintained a constant state of alert and concern. The owner reported that even at home he rarely relaxed.

The dog showed a marked olfactory exploration behavior, when he was not exploring, he was often owner-oriented. He promptly responded to owner's call and he was effectively reassured by visual and physical contact with him. The dog had learned to go to an area prepared with a mattress every time the intercom of the clinic rang. During the consultation the low motivation to play and the high interest in food rewards were confirmed.

Laboratory and imaging tests were performed to rule out medical reasons related to PU/PD. The results of the CBC were normal, while the biochemical profile revealed an increase in ALT enzyme (138 IU/ l, with reference range 10-60). The coprological examination for flotation was negative. Urinalysis showed a specific weight at the lower limit of the isosthenuric range (1008 g/l) (Di Bartola & Westropp, 2015; Skeldon & Ristic, 2017).

After excluding an inflammatory state, the diagnostic procedure was deepened through the dosage of urinary cortisol and an abdominal ultrasound: both tests were negative. The execution of a modified water restriction test (Bulliot & Hébert, 2016) was evaluated, taking into account its potential inapplicability: polydipsia, in fact, especially if prolonged, can reduce the hyperosmolarity of the interstice medullary (cd wash-out) with consequent inability to concentrate urine in response to water deprivation (Fanton et al., 1988; Schoeman, 2008; Taylor et al., 2010; Long et al., 2015; Nelson, 2015; Skeldon & Ristic, 2017) and, in these cases, testing serum osmolality becomes a more reasonable option (Feldman, 2007). The deprivation test was not actually performed, because the polydipsia, from intermittent, entirely stopped in the next 10 days.

Diagnosis

Increased water intake and urine production are more frequently due to medical causes (Nichols, 2001; Landsberg et al., 2013c; Nelson, 2015). An amount of water between 80 and 100 ml/kg/day suggests the possibility of polydipsia, while an intake of more than 100 ml/kg/day confirms it (Nelson, 2015; Skeldon & Ristic, 2017). Animals suffering from these disorders could present the low urinary specific weight as the only laboratory anomaly (Nichols, 2001).

In the case in question, both the requirements were ascertained; in fact, during critical periods, the intake of water exceeded 80-100 ml/kg/day and the specific urinary weight was at the minimum limit of the isosthenuric range. This calculation must be carried out at home (Behrend, 2005; Bruyette, 2015).

After having ascertained the presence of polyuria and polydipsia, the laboratory and ultrasound findings allowed to exclude the most probable medical causes: hyperadrenocorticism, diabetes mellitus, liver failure, chronic renal failure, pyelonephritis, hypokalemia, hypercalcemia, hypoadrenocorticism and acquired nephrogenic diabetes insipidus secondary. Central diabetes and psychogenic polydipsia were therefore investigated, because the biochemical screening tests showed no abnormalities during these rare conditions (Landsberg et al., 2013c; Nelson, 2015). At this point of the diagnostic procedure, however, the polydipsia began to decrease in frequency until it disappeared, probably for the effect of the behavioral therapy associated with the nutraceutical.

The first behavioral interventions, which decrease immediately the polydipsia, allowed to diagnosticate a psychogenic polydipsia, sign of a displacement behavior and/or attention seeking behavior. A displacement behavior is defined as a response that is apparently out of context (but normal in itself), capable of unloading the tension generated by a situation of conflict and frustration (Landsberg et al., 2013d). The attention seeking behavior can occur when the dog is fearful, anxious or participates in inconsistent interactions, allowing him to obtain information from the environment and, at the same time, be reassured by the owner; the latter can also reinforce it involuntarily, increasing its emission frequency (operant conditioning) (Overall, 2013a; Denenberg, 2018).

The fact that the behavior was exhibited mainly in the presence of the owners, excluded a separation problem, which implies the absence (real or perceived) of family members (Landsberg et al., 2013d; Overall, 2013a; Horwitz, 2018).

Some reservations need to be maintained in the interpretation of primary polyuria, given that in humans it has been shown that chronic hyperhydration regulates the release of vasopressin in response to hypertonicity (Rijnberk, 2007) and that also in dogs with primary polydipsia there are indications for abnormalities in the release of this hormone: a study by Van Vonderee et al. (1999) has shown that in some dogs with primary polydipsia there may be a non-linear relationship between vasopressin and plasmatic osmolality.

In this case, inappropriate urination was related to both psychogenic polydipsia (Tynes, 2018) and other causes, considering that it also occurred when drinking was normal.

Other differential diagnoses include: "submission"/conflictual urination; excitation urination and separation distress (Landsberg et al., 2013e; Overall, 2013a; Tynes, 2018).

Treatment

Regarding polydipsia, it is advisable to limit water intake reasonably, taking into account the chronic nature of this behavior. The reduction in recruitment to acceptable volumes must, in fact, be attempted over many weeks, in order to help the dog to establish alternative coping strategies while behavioral and pharmacological therapies are carried out (Landsberg et al., 2013c).

The owner was asked to calculate, approximately, the water consumption in 24 hours and to reduce it by 10% every week (Nelson, 2015), by dividing the daily volume into numerous administrations (Nelson, 2015) or with the use of a modified bowl that reduces water intake times (for example, DrinkBetter®); both possibilities are feasible only if the dog is already acquiring new coping strategies with other therapeutic aids, because otherwise the problem could get worse.

To counteract the reduced medullary hyperosmolarity, it was recommended to orally administer cooking salt (1g / 30 kg every 12 hours) for 3-5 days (Nelson, 2015).

It was explained to the owners to not punish the dog when he carries out the undesirable behavior, because punishment could increase anxiety and fear, as well as not teaching him any-

thing new (Landsberg et al., 2013c, d; Sueda, 2018). It should rather identify when the dog is going to drink (even using a diary), in order to anticipate him and involved him in other activities (social interactions, play, exercises), rewarding him for the activity; in this way, undesirable behavior is redirected towards an alternative action, such as "Come!"/ "Look!"/ "Sit!" (Landsberg et al., 2013c).

Regarding inappropriate urination, the owner was instructed to prevent the situations generating conflict and stress. When exposure cannot be avoided, the owner was explained how to weaken stressful social stimuli, focusing on the interactions with the owners and managing the encounter with strangers. Finally, it is advisable to keep the bladder as empty as possible (Overall, 2013a), so it was suggested to increase the walks before predictable stressful/exciting events.

Concerning the anxiety, it was recommended to reinforce any state of calm, enrich the environment (for mental and physical stimulation) and create a routine that was as predictable as possible (Landsberg et al., 2013c, d; Sueda, 2018). The owner decided to take the dog at his work place, a choice that gave several advantages: more opportunities to urinate out; more time spent together with the owner; daily routine more stable, at least on weekdays.

Since the relationship with the owners was already optimal, they were only advised to try to maintain a calm attitude when the dog showed the undesirable behavior, to avoid increasing their negative emotional state (Palagi et al., 2015; Albuquerque et al., 2018; Sinischalchi et al., 2018).

Daily exercises (sessions of 10-15 minutes) were recommended. In particular we suggested the use of Kong® Senior, with initial low level of difficulty and in controlled situations (quiet and familiar areas and under the supervision of the owner, so as to be able to verify the reactions and evaluate the right moment to leave the dog with the object), mentally stimulating activities with the owner and problem-solving activities (Landsberg et al., 2013a).

When the dog was alone at home, it was advised to muffle external noises with the help of white noises (Landsberg et al., 2013d) or relaxing CDs (Wells et al., 2002; Boone & Quelch 2003), not before having carried out tests to exclude that they did not create stress to the animal.

Finally, the use of a food supplement based on L-theanine (Anxitane®) (for one month 4.5 mg/Kg BID for the first 7 days, then moving to 3 mg/Kg BID) was recommended. Several studies have suggested that this nutraceutical is effective in reducing behavioral responses related to anxiety and fear (Dramard et al., 2007; Araujo et al., 2010; Pike et al., 2015).

Follow up

Two weeks after the first visit and during the following months, there were no more episodes of polydipsia, so the water restriction program was not undertaken. Daily intake of water (with free access to the source) settled on 70 ml/kg/day and urinary specific gravity, measured on samples collected at different times of the day for greater reliability (Nelson, 2015; Skeldon & Ristic, 2017), remained stable between 1015 and 1017 g/l, in conditions of normal hydration. These values were curiously confirmed even after an empirical water restriction at 3 and 6 hours, when in a healthy subject we would expect differently; this apparent inability to concentrate the urine would support the thesis that animals suffering from polyuria and polydipsia, suffering from the loss of solutes in the renal medulla, tend to produce relatively dilute urine (Fanton et al., 1988; Schoeman, 2008; Taylor et al., 2010; Long et al., 2015; Nelson, 2015; Skeldon & Ristic, 2017). Oral salt administration did not change the situation.

During the first month after the visit, guests were not invited into the house; the weekly routine was regularized, except for the weekend; once a week nose work were performed with the owner; the biweekly Kong® activity turned out to be enthusiastic. During this period, two episodes of excitement/emotional urination took place: one, with attached defecation, as a result of a chase to a blowfly; the second, after playing with the Kong®. In this regard, it is advisable to

refine the interaction with the object, bringing the dog to urinate before interacting with the Kong® and avoiding removing the object quickly after it has been emptied, either because this could be interpreted as a negative punishment, both because after a first engaging and exciting interaction linked to the consumption of food (highly euphoric for the dog), a second, more bland interaction could help to diminish the arousal in a more natural way.

Two months after the visit, sporadic episodes of conflict urination occurred, almost exclusively during the weekend, when it was easier for both owners to be present and because the regularity of the weekly routine disappeared. In this regard, it was very useful, but not always enough, to involve the dog in alternative activities.

Anxitane® at initial dosage (4.5 mg/kg BID) was prescribed for few days before stressful events.

Three months after the visit, the episodes of inappropriate urination during the weekend increased, although remaining below the average. Answer replacement exercises and nose work were no longer implemented, but Kong® was maintained 1-2 times a week. It was decided to associate with Anxitane®, Adaptil® collar for one month. The use of the collar did not yield results worthy of note and was therefore not reapplied the following month. The owner also decided to suspend Anxitane®.

Four months after the visit, the situation had not changed much: occasional urination from excitement in different environments and conflict urination/"submission" almost exclusively at home during the weekend. The owner, however, reported that the dog apparently had less control over the urinary sphincter. For this specific problem there are two possible molecules: phenylpropanolamine, which can help in cases of "submission" and excitement urination if a poor sphincter competence is a concurrent factor (Landsberg et al., 2013b, e; Tynes, 2018), and clomipramine which, given the cardiocirculatory side effects of phenylpropanolamine and the established anxious component of undesirable behavior, would be more appropriate in this case, since it would produce both anxiolytic and moderately anticholinergic effects by increasing the urethral sphincter tone (Landsberg et al., 2013b). Furthermore, clomipramine was taken in the past without any adverse effects.

Conclusion

To date, the dog is not following any nutraceutical or pharmacological treatment, and the situation is under control (two to three episodes per month) with behavioral and environmental management. The owner is open to the possibility of undertaking drug treatment in the future.

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Un caso di polidipsia e di urinazione inappropriata in un cane meticcio

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Sintesi

Un cane meticcio, castrato, di 10 anni e 16 Kg di peso è stato esaminato per polidipsia e urinazione inappropriata.

La polidipsia si manifestava in eventi stressanti o di noia apparente, mentre l'urinazione inappropriata avveniva anche senza una chiara stimolazione esterna, in diverse zone della casa e in momenti diversi del giorno e della settimana.

I risultati degli esami di laboratorio e ecografici permisero di escludere una causa organica. L'intermittenza della polidipsia, insieme al fatto che era rapidamente diminuita in seguito ad un intervento esclusivamente comportamentale, ha permesso di diagnosticare una polidipsia psicogena.

Al proprietario fu chiesto di calcolare, approssimativamente, il consumo di acqua nelle 24 ore e di ridurlo del 10% ogni settimana.

È stato spiegato ai proprietari che il cane non dovrebbe essere punito quando si emette comportamenti indesiderati poiché ciò può aumentare l'ansia e la paura, oltre a non insegnargli nulla di nuovo.

Si dovrebbe invece individuare le situazioni che inducono il cane a bere (anche usando un diario), in modo da anticiparlo e coinvolgerlo in altre attività (interazioni sociali, gioco, esercizi), premiandolo; in questo modo, il comportamento indesiderato è rediretto verso un'azione alternativa, come "Vieni", "Guarda", "Seduto".

Il proprietario è stato educato a prevenire, quando possibile, le situazioni che generano conflitto e stress. È stato suggerito l'uso del Kong®Senior, inizialmente con un basso livello di difficoltà e in situazioni controllate.

È stata inoltre raccomandato di integrare la dieta con L-teanina (Anxitane®) (per un mese 4,5 mg/Kg BID per i primi 7 giorni, quindi 3 mg/Kg BID).

Due settimane dopo la prima visita e nei mesi seguenti, non ci furono episodi di polidipsia, per cui la restrizione idrica non fu applicata.

Nel primo mese dopo la visita, non furono invitati ospiti a casa; la routine settimanale era regolare, ad eccezione del week-end; una volta a settimana erano effettuati giochi di fiuto con il proprietario. Il gioco con il Kong, bisettimanale, era molto gradito dal cane.

Durante questo periodo, si verificarono due episodi di urinazione emozionale o da eccitazione. Si decise quindi di associare all'Anxitane, l'Adaptil collare, per un mese. L'uso del colare non diede risultati e perciò non fu applicato nel mese successivo. Il proprietario decise anche di sospendere l'Anxitane.

Quattro mesi dopo la visita la situazione non era cambiata: si verificavano episodi di urinazione da eccitazione in differenti ambienti e urinazione da "sottomissione" o da conflitto, quasi esclusivamente a casa durante il weekend.

Il proprietario riferiva l'impressione che il cane avesse un minor controllo dello sfintere uretrale. Ad oggi il cane non è sottoposto a trattamenti farmacologici o con nutraceutici e la situazione è sotto controllo (2-3 episodi al mese) in seguito a gestione comportamentale ed ambientale. Il proprietario è disponibile alla possibilità di sottoporre il cane, in futuro, ad un trattamento farmacologico.