

# Psychogenic polydipsia in a Poodle

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*Abstract:* Medium size Poodle, 6 years old, entire male, was brought to the consult for polyuria-polydipsia and inappropriate urination. Anamnesis, health and behavioural evaluation have shown anxiety and aggressive behaviours towards the owners. Clinical and laboratory examinations were necessary to rule out possible underlying medical pathologies.

Presumptive diagnosis was psychogenic polydipsia and inappropriate urination, chronic anxiety, irritable aggression.

Behavioral therapy aimed at improving events predictability for the dog during the day, avoiding conflict situations and punishments, reinforcing calm states, getting the dog used to the kennel, taking him out in quiet places without encountering people or other dogs, doing short exercises of scent discrimination and nosework in order to relax the dog and improve his self-esteem.

Medical treatment consisted in antibiotics and anti-inflammatory for cystitis, hepatoprotectors for chronic hepatitis, nutraceuticals as an aid for anxiety.

After about one month, the dog had improved but the owners communicated that they could not do what was suggested and that they renounced the adoption. The real improvement has occurred with the successive adoption by an old couple.

*Key Words:* Behavioral problems; polyuria-polydipsia and inappropriate urination; anxiety; aggressive behavior.

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## Presentation

A medium size Poodle, 6 years old, entire male, was brought to the consult for inappropriate urination. The dog was adopted the month before and the behavioral problem was getting worse.

## History and presenting signs

The dog was adopted through an Animalist Association and the history of his previous life is unknown. When the first consultation was held, he was living in a very small apartment in the city with a tiny balcony, with two middle-aged women, a 5-year-old neutered female poodle and 2 adult neutered male cats.

Since the first day, the dog has been urinating inside the house, marking chairs, sofas and furniture. At night, he could not sleep more than a few hours and for the rest of the time he wandered around the house marking. During the day, the owners took both dogs in their office until the evening; at the beginning, the poodle did not urinate there but after a while he started doing it too. At night the owner, who seemed to be preferred by the dog, tried to tie the dog close to her bed with a long leash, avoiding the unwanted behaviour. This solution worked just for a few days.

Both dogs were taken out for short walks 3 times a day, near the house. Sometimes the owners

left the dog for a few hours to the old grandmother who lived alone. At the beginning, the dog was urinating also in grandmother's home, but he ceased the behavior after some days.

About 10 days after the adoption, the behavioral problem worsened and the dog started to urinate even while he was climbing the stairs and while he was eating. During the food consumption sometimes the dog defecated. Furthermore, he started growling when he was scolded and when he was urinating if someone was watching him. Once he bit one of the owners and the bite was withheld.

Concerning social interaction, the dog tried to avoid contact and interactions with strangers but he did not show aggression and, if approached with kindness, he was open to interaction. No particular problems were reported with the two cats living with him. The play behavior, both interspecific and intraspecific, was completely absent. The owners also reported that the dog showed fear signs, displayed through an avoidance behavior, towards hands coming from above, fast hand movements and loud voices.

In regards to the sleep, its duration was normal also if the body position of the dog was always curled and he often urinated on his bed.

## Examination

The first visit was held in the vet's office and both owners were present with the two dogs. During the examination the dog was constantly searching for the owners, both on leash and off leash. He showed a limited explorative behavior once he was free in the room. When he was called, he showed a fairly good level of attention and obedience. During the visit he did not urinate nor drink.

The second visit was held at the owner's house, at first indoor and then outdoor on a walk. At the beginning the dog was much focused on one of the two owners. When the female dog attempted to push him away twice, he quickly drank a whole bowl of water of about half liter. Outdoor he marked a lot, even in front of 2 threatening dogs and he drank a lot at a fountain. During a short training session, he showed some signs of stress but he was able to cope and succeed in following the instructions he was given.

## Physical and laboratory evaluation

Urine test showed a clinical panel of cystitis with rare struvite crystals and a density of 1010. The full blood count resulted normal while the biochemical profile showed an increase of AST and ALP values and a mild hyponatraemia.

Ultrasound examination of the abdomen showed:

- Liver: slight increased echogenicity, regular margins, acalculous gallbladder.
- Spleen: normal echostructure.
- Kidneys: corticomedullary differentiation maintained.
- Adrenal glands: left 6.4 mm, right 5.8 mm. Both of normal dimensions and morphology.
- Testes: normoechoic.
- Prostate: length 25.1 mm, width 23.6 mm, normal in echogenicity and dimensions.

At this point, a series of diagnostic investigations were carried out for the differential diagnosis of polyuria-polydipsia:

- ACTH stimulation test for Cushing syndrome was negative;
- water deprivation test for diabetes insipidus was negative.

## Diagnosis

In view of these symptoms: polyuria-polydipsia, emotional urination, excessive attention requests and the lacking organic pathologies, the diagnosis was: psychogenic polydipsia (PPD) and inappropriate urination; chronic (or permanent) anxiety due to communication mistakes and repeated punishments by the previous owners; irritable aggression.

## Differential diagnosis

Organic urogenital pathologies, diabetes insipidus and Cushing disease were ruled out by the results of the tests carried out.

Separation anxiety was also ruled out because inappropriate urination occurred both in the absence of the owners and in their presence. In fact, the most distinguishing factor of separation-induced elimination is that the problem occurs only when the dog is isolated and never when the owner is present (Case, 2010).

## Treatment

### *Medical treatment*

Medical treatment consisted in a therapy with antibiotics and anti-inflammatory for treating the cystitis that was resolved in 10 days, hepatoprotectors and appropriate diet for the chronic hepatitis: an evident improvement was present after 2 weeks. Moreover, nutraceuticals (Anxitane) and pheromones (Adaptil collar) were prescribed for anxiety.

### *Behavioral therapy*

Behavioral therapy focused on improving events predictability for the dog during the day. The suggestion was to have regular walks outside, food administration and sleep.

The owners were advised:

- to take walks with the dog on a leash in quiet and open places, allowing him to smell and mark;
- to decrease the encounters with other dogs and people;
- to do short and simple nosework exercises in order to relax him and improve his self-esteem;
- to clean urine and faeces without scolding or punishing him;
- to reward the calm behavior of the dog.

In order to safeguard the emotional state of the female dog living with him, it was suggested to manage the 2 dogs separately for what concerned walks, spaces and rituals.

It was also suggested to get the dog gradually used to the kennel.

Regarding the management of the dog in the absence of the owners, they were advised to habituate the dog to stay on the balcony, providing a comfortable kennel and leave him some toys. In this way also the interactions with the other dog could be simpler to control.

Because the clinical case requires a complicated behavioral management, it was recommended to the owners to be accompanied by a dog trainer who could support them during the walks with the dog.

## Follow up

After about twenty days since the first visit, the dog had a mild improvement: the frequency of urination decreased and aggression was no longer present.

During the consultation the owners reported that the dog, in the following weeks and only for a few days, would have to live with a male Golden Retriever, owned by the father of one of the two owners.

Because this event could alter the situation, the owners were advised to pay attention to the meetings between the two dogs and Alprazolam (0.025 mg PRN) was prescribed for precaution. The cohabitation with the Golden Retriever did not cause any relevant problem but symptomatology shown by the poodle worsened the days after the departure of the Golden Retriever. The dog presented newly urination while he was eating and he bit the favorite owner. The aggression caused only an excoriation because the bite was withheld but inhibited. The attack took place while the owner was trying to keep the dog away from the bowl to clean urine on the floor. Two months after the first visit, the owners report that they were unable to continue the behavioral modification therapy and that they intended to renounce to dog ownership. Despite these claims the owners maintain the property of the dog for another month, during which the animal exhibited two new aggressive episodes.

Three months after the first consult, the owners decided to avoid any kind of treatment

During the summer holidays, the dog spent one month at the parents' house of one of the two owners and he got so attached to the elderly couple (who had lost their dog a few months earlier) that the two owners decided to leave him with them. During the three following months there were just two episodes of inappropriate urination while the biting episodes disappeared and the dog's motivation to play increased.

## Summary and discussion

In all cases in which there is an alteration of behavior it is necessary to exclude a possible cause of medical nature. In this clinical case, polyuria-polydipsia (PU/PD) can be a common sign of different pathologies, therefore many possible clinical factors must be ruled out.

In general, PU and PD are referred together and, except for dogs with psychogenic polydipsia, polydipsia usually occurs in response to polyuria.

In human pathology "there are some instances of abnormally high fluid intake that are not secondary to fluid loss or hypertonicity of body fluids and compulsive water drinking has been described in human beings with psychologic disturbances: these are classified as primary polydipsia or psychogenic polydipsia. Affected patients have a normal ADH release mechanism and renal function, and their polyuria is solely the result of polydipsia" (Mullnix et al., 1976).

"When excessive and inadequately excreted by the kidneys, polydipsic water intake may result in dangerous level of overhydration that lead to severe hyponatremia, water intoxication, seizures and, sometimes death. Many of these primary polydipsia have been associated with various types of psychosis and is probable that some polydipsic individuals do not experience an excessive thirst. A more common occurrence of polydipsia is that seen in schizophrenia and the neural mechanisms causing polydipsia in schizophrenia are unknown" (McKinley et al., 2004).

Although lesions in the thirst center of the hypothalamus have been described as a cause of severe polydipsia in humans, these lesions have not yet been seen in dogs. Usually affected animals are hyperactive dogs that are placed in exercise-restrictive environments or had significant changes to their environment, resulting in unusual stress (Feldman, 1989).

In dogs, the compulsive consumption of water is generally linked to specific stimuli, while stress-induced (psychogenic) polydipsia is more often associated to more general stressors and agitation. (Horwitz et al., 2004).

Psychogenic polydipsia (PPD) in dogs is a rare disease that usually occurs in big-sized dogs. The owners of the most affected subjects report that their dogs have a nervous disposition or have experienced a stressful event prior to the onset of polydipsia (Nelson & Couto, 2015).

Landsberg reports that some dogs are unable to control urine voluntarily when fearful or responding submissively to social stimuli. Many cases are conflict-induced in that the dog is in a situation of uncertainty or competing motivation as to how to greet effectively (approach/withdrawal). Attempts to punish will aggravate fear and conflict. Owners that are upset or show their displeasure add to the dog's anxiety and conflict since the pet has little or no control over the behavior (Landsberg et al., 2013).

According to Fenner, psychogenic polydipsia is a not-well-described disorder of water balance and the medical and clinical history is similar to that of diabetes insipidus. It can start after an unusual or stressful event and its pathophysiology is unknown. Probably, it starts with voluntary polydipsia as the result of stress or boredom but once polydipsia has caused a prolonged polyuria, the loss of renal medullary solute and the altered attention span can contribute to the perpetration of the problem. We cannot exclude that some of these dogs may have a subconsciously acquired defect of thirst regulation, as described for humans (Fenner, 1996).

In the dog, although thirst is mainly regulated by osmotic stimuli and circulatory volume, it can be, in part, a conditioned response. Impulses of cortical (voluntary) origin can cause the sensation of thirst and condition a thirst appetite (Olenick, 1999).

In a study on 58 dogs, most of the confirmed cases of psychogenic polydipsia had a behavioral basis, such as gaining attention from the owner, being exercise restricted or after experiencing a stressful event. Other cases are idiopathic (Mulnix et al., 1976).

Moreover the owners of affected dogs may report that the animal has a nervous disposition or experienced some stressful event before the onset of polydipsia. In some cases, the owner has unknowingly reinforced the water drinking behavior in some way. Some dogs with PPD dramatically decrease their water consumption during hospitalization and this fact facilitates diagnosis.

Concerning the laboratory data, it is important to point up that dogs with PPD typically have extremely hyposthenuric urine (Nelson & Couto, 2014). The production of hyposthenuric urine is caused by the attempt of the kidneys to dilute urine or by an insufficient response of renal collecting tubules to ADH: this occurs in primary psychogenic polydipsia, where the patient introduces water in excess and suppresses ADH production in order to eliminate water but not solutes in the kidneys. In order to differentiate psychogenic polydipsia from diabetes insipidus it is used the water deprivation test, based on serial measurements of urine specific gravity after the gradual deprivation of drinking water (Zatelli, 2014). Although not consistently present, mild hyponatremia in a dog with marked hyposthenuria is suggestive of PPD.

Dogs with PPD of recent onset often have a normal response to abrupt water deprivation testing, but those with long-standing PPD develop renal medullary washout of solute because the release of vasopressin from the pituitary gland is suppressed by plasma hypo-osmolality. Vasopressin normally facilitates urea reabsorption in the inner medulla of the kidney and helps maintain medullary hypertonicity (Nelson & Couto, 2014).

Care must be taken to differentiate psychogenic polydipsia from the polydipsia secondary to polyuria of pathogenic origin. Water intake may be restricted in the case of psychogenic polydipsia but would be dangerous in the case of pathogenic polydipsia (Houpt, 1991).

Gradual water deprivation testing allows time for restoration of the renal medullary solute gradient and is the preferred diagnostic test in dogs with PPD (Nelson & Couto, 2014) and the water deprivation test is the time-honored test commonly used for differential central diabetes insipidus (DI), primary nephrogenic DI, and psychogenic polydipsia. This test is designed to determine if endogenous ADH is released in response to dehydration and whether the kidney can respond normally to circulating ADH (Nichols, 2001). In this reported case, the results of the gradual water deprivation test were clearly positive and this confirms the diagnostic hypothesis of psychogenic polydipsia.

As already reported by several authors, in the genesis of this pathology an important role is played by anxiety, that is to say, a reactive state caused by an increased probability of emotional reactions similar to those of fear, in response to any variation in the internal and external environment, so that the result is an incapability of adapting to any environmental variation.

PD and PU can be, as in this case, symptoms of permanent anxiety, that is to say, a continuous anxious state that causes a serious inadaptability. Permanent anxiety represents the evolution of 70% of the cases with intermittent anxiety and, within it, potomania represents about 5% (Pageat, 1999).

Permanent anxiety translates into a serotonergic hyperactivity and in a decrease of dopaminergic activity and in general it does not cause neurovegetative signs. It is characterised by behavioral inhibition signs like a clear decrease of explorative and aggressive behaviors and alternative behaviors like bulimia, licking, potomania (Mège et al., 2006).

As has been said earlier, in this case there is also polyuria that can be related to inappropriate urination, which means that the release of important quantities of urine in different places of the house, deposited in big puddles on an absorbent and modifiable horizontal layer (i.e. fabric) so that it is possible to perform the typical sequence of the behaviour. This sequence is usually complete (Colangeli et al., 2015).

Concerning irritable aggression: in this case, irritable aggression always occurred in a context that caused a lot of anxiety to the dog: in the presence of food, urine smell, other animals and when the owner bent over the dog in order to pick him up and remove him from where he was. The behavioral sequence was complete. In the past, irritable aggression was considered a classic symptom of sociopathy, always present in dominant subjects and most of the times caused by any attempt to permanently maintain a physical contact started by a submissive one (Pageat, 1999). Today irritable aggression is a fairly frequent kind of aggression, caused by various factors and often linked to frustration. It can be aggravated by pain, by deprivations such as thirst or hunger, by dysendocrinism, by sensory alterations (hearing, sight), by stress, by frustration and by the persistency of an interaction after the animal clearly communicated that he wanted to interrupt it (Colangeli et al., 2015; Horwitz et al., 2004). It occurs when the animal limit of tolerance. This can happen when he shows he wants to stop the interaction or when he is not able to cope with stress, (e.g. he is incapable of waiting). There might be an enlargement of the critical distance with negative reinforcement given by the going away of the stranger that can evolve in a very rigid sequence and in a possible instrumentalisation (Colangeli, 2007). It is not specific to the stimulus nor to the target, it is not directly applicable to the aggression exhibited in a social context (Horwitz et al., 2004), and it can be instrumentalised more rapidly (Mège et al., 2006): the appetitive and the fulfilment phase become shorter while only the consummatory phase remains (Colangeli et al., 2015)

Finally, we would like to emphasise the great difficulties we had with the owners. We think that the initial negative result of this case was also determined by the lack of therapeutic alliance or compliance that would have allowed us to find new operating modalities and different strategic approaches to the problem. Thanks to this, it was clear that the veterinary behaviorist needs to acquire relational and communication skills, as already suggested by several authors. In fact, the behavioral therapy can be defined, in part, as a complex intervention with a systemic character based on the alliance with the owner, on the investigating ability, on the understanding of the symptoms and of the relationship between the person and his animal, on the support offered for the changes that occur during the therapy (Alessio, 2005).

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## Polidipsia psicogena in un cane di razza Barbone

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### *Sintesi*

Un cane di razza Barbone, di taglia media e di 6 anni di età fu presentato alla visita per sintomi di poliuria-polidipsia ed urinazione inappropriata.

L'anamnesi, la visita comportamentale e clinica rilevarono uno stato di ansia e comportamenti aggressivi verso i proprietari. Furono effettuati esami clinici e di laboratorio per escludere patologie organiche

La diagnosi presunta fu di polidipsia psicogena e urinazione inappropriata, ansia cronica ed aggressività da irritazione.

La terapia comportamentale fu improntata a:

- aumentare la prevedibilità, per il cane, degli eventi quotidiani,
- evitare situazioni di conflitto e punizioni,
- rinforzare gli stati di calma,
- abituare il cane ad utilizzare il kennel,
- effettuare uscite fuori in luoghi tranquilli,
- evitare di incontrare altri cani o persone,
- effettuare brevi esercizi di discriminazione olfattiva e di ricerca per rilassare il cane ed aumentare la sua autostima.

La terapia medica consistette nella somministrazione di antibiotici ed antiinfiammatori per la cura della cistite, di epatoprotettori per l'epatite cronica e di nutraceutici come ausilio nella gestione dell'ansia.

Dopo circa un mese, il comportamento del cane migliorò notevolmente ma i proprietari manifestarono l'intenzione di rinunciare alla proprietà del cane poiché non erano in grado di seguire il programma di modificazione comportamentale che era stato loro suggerito.

Un definitivo miglioramento del quadro clinico si ebbe quando il cane fu in seguito adottato dai genitori di una delle due proprietarie.