ACTH Level and Sodium-Potassium Ratio in Screening of Primary Canine Hypoadrenocorticism

Case Report

This article describes a primary hypoadrenocorticism (HA) case report in a spayed mix-breed German shepherd ten years old female dog that had unspecific symptoms during a week. The initial symptoms were vomiting, weakness and anorexia that are associated to multiple systems and illnesses, as gastrointestinal, renal or neurologic disorders. HA can affect dogs of any age, but normally it occurs in young to middle-aged dogs, especially females [2-4].

The primary HA clinical signs occur when at least 80-90% of adrenal gland tissue is destroyed, resulting in mineral corticoids deficiencies [5]. The absence of negative feedback results in a high serum level of ACTH [6]. The primary HA clinical signs were vomiting, weakness and anorexia. The owner's complaints are related to nonspecific signs, as vomiting, lethargy, weakness and anorexia that are associated to multiple systems and illnesses, as gastrointestinal, renal or neurologic disorders. HA can affect dogs of any age, but normally it occurs in young to middle-aged dogs, especially females [2-4].

The ACTH stimulation test is the gold standard for diagnosing HA in dogs and consists to measure cortisol levels before and after administration of synthetic or commercial gel preparations of purified porcine pituitary extract [6,7]. However, problems with the availability of synthetic ACTH and increased costs have prompted the need for alternative methods, especially in developing countries [6].

Secondary HA is a rare condition characterized by deficient pituitary secretion of ACTH; iatrogenic HA is more common than the naturally occurring form and usually results from exogenous glucocorticoid administration. In this circumstance, aldosterone secretion is preserved and serum electrolytes persist normal [1,5]. Electrolytes abnormalities may be used to distinguish primary to secondary HA, as they hardly change in secondary HA [2,3]. Therefore, calculation of the sodium-potassium ratio and plasma ACTH level is a useful screening test for diagnosing primary HA [6].

Case Report and Diagnosis Procedures

A spayed mix-breed German shepherd ten years female dog showed increasing clinical signs, as vomiting, weakness and anorexia for a week. The animal had a complete schedule of vaccination and ecto/endoparasites prevention, including heartworms. The initial diagnosis was a simple poisoning case, being medicated. As there was not improvement in the general symptoms, a treatment with fluid therapy and supportive care was started in a veterinary hospital. Laboratory exams indicated thrombocytopenia and azotemia. The enzyme-linked immunosorbent assay (ELISA) SNAP test was performed...
in order to investigate Erlichiosis, resulting negative. After medication, the clinical signs were controlled and exams were normal and the bitch was released. After four days, the animal got worse, stopping to eat and showing ataxia. Complementary exams (head/thoracic radiographs and abdominal ultrasound) were performed, without significant results, except a reduction in spleen volume for hypovolemia. That time, hematologic evaluation revealed normochromic normocytic anemia, anisocytosis, rouleaux erythrocyte, polychromasia, leukocytosis (neutrophilia and monocytosis) and normal count of platelets. The Na: K was decreased (23:1), so the suspicion of diagnosis was HA, confirmed by the high plasma ACTH level (248 pg/mL). Again, fluid therapy and supportive care were given to patient and proper therapy (prednisolone and fludrocortisone) was started; a marked progress of general clinical signs was noted. The stabilization of primary HA is defined for absence of symptoms with a sodium: potassium ratio >27:1 and both electrolyte concentrations within a laboratory reference levels [8]. After three years, the HA is controlled and the patient is in good health, with normal appetite and activity; secondary diabetes or other concurrent abnormalities were not noted until the present date.

**Discussion**

Primary HA is normally ignored in veterinary practice, especially for its capability to pretend clinical signs shared to other disorders. In this particular case, initial suspicious was poisoning and renal insufficiency; only after failed therapies and unsuccessful diagnosis an endocrinopathy was supposed. Although gold standard definitive test to identify HA is ACTH stimulation test, the conclusion was achieved by a combination of clinical signs, Na: K and plasma ACTH level, since availability of synthetic ACTH for the test and increased costs make this exam particularly hard to get in developing countries, showing the need of alternative methods.

**Conclusion**

This case report describes a chronic HA case in a patient that still remains healthy after three years under appropriated treatment. Interestingly, the definitive diagnosis was based on clinical signs, Na: K and only ACTH blood measure, without ACTH stimulation test. This article is important to remind clinicians about this often neglected disease in the clinical routine once the HA is an uncommon disease in dogs and the difficult for veterinarian to identify. Moreover, it emphasizes an alternative scheme to improve and make easier HA diagnosis.

**References**