

Vet Intern Med. ;21 (6):1168-73 18196721 (P,S,E,B)

Abnormalities of serum electrolyte concentrations in dogs with hypoadrenocorticism.

Jennifer A Adler, Kenneth J Drobatz, Rebecka S Hess

BACKGROUND: The sensitivity and specificity of the sodium to potassium ratio (Na:K ratio) as a cutoff for recommendation of an adrenocorticotrophic hormone (ACTH) stimulation test in dogs suspected of having hypoadrenocorticism (HA) is unknown. Additionally, abnormalities in plasma ionized calcium (iCa²⁺) and ionized magnesium (iMg²⁺) concentrations and venous pH of dogs with HA are incompletely documented. **OBJECTIVES:** To define the sensitivity and specificity of the Na:K ratio as a diagnostic aid for HA in dogs and to examine for associations between venous pH and the Na:K ratio, iCa²⁺ concentration, or iMg²⁺ concentration in dogs with HA. **ANIMALS:** Seventy-six dogs with HA and 200 dogs randomly selected from the general hospital population. **METHODS:** Retrospective study. Dogs were included in the study if results of an ACTH stimulation test confirmed a diagnosis of HA, the dog had a serum sodium concentration below the reference range or a serum potassium concentration above the reference range, and the dog was treated with mineralocorticoids. Receiver operating curve analysis was used to determine optimal cutoffs of sensitivity and specificity for the Na:K ratio in diagnosing HA. **RESULTS:** Use of Na:K ratios of 27 or 28 classified 95% of dogs correctly as diseased or not diseased. The sensitivity of a Na:K ratio of 28 was 93% (CI, 85-98%) and that of 27 was 89% (CI, 80-95%). The specificity of a Na:K ratio of 28 was 96% (CI, 92-98%) and that of 27 was 97% (CI, 93- 99%). The sensitivity and specificity of a Na:K ratio of 24 were 79% (95% CI, 67-86%) and 100% (98%, CI, 97%-100%), respectively. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Na:K ratios of 27 or 28 identify the highest percentage of dogs with suspected mineralocorticoid and glucocorticoid deficiency correctly. In dogs with a Na:K ratio of 24 or less, the likelihood of confirming a diagnosis of HA with an ACTH stimulation test is high.

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ionized magnesium (iMg²⁺) concentrations and venous pH of dogs with HA are incompletely documented. OBJECTIVES: To define the sensitivity and specificity of the Na:K ratio as a diagnostic aid for HA in dogs and to examine for associations between venous pH and the Na:K ratio, iCa²⁺ concentration, or iMg²⁺ concentration in dogs with HA. ANIMALS: Seventy-six dogs with HA and 200 dogs randomly selected from the general hospital population. METHODS: Retrospective study. Dogs were included in the study if results of an ACTH stimulation test confirmed a diagnosis of HA, the dog had a serum sodium concentration below the reference range or a serum potassium concentration above the reference range, and the dog was treated with mineralocorticoids. Receiver operating curve analysis was used to determine optimal cutoffs of sensitivity and specificity for the Na:K ratio in diagnosing HA. RESULTS: Use of Na:K ratios of 27 or 28 classified 95% of dogs correctly as diseased or not diseased. The sensitivity of a Na:K ratio of 28 was 93% (CI, 85-98%) and that of 27 was 89% (CI, 80-95%). The specificity of a Na:K ratio of 28 was 96% (CI, 92-98%) and that of 27 was 97% (CI, 93- 99%). The sensitivity and specificity of a Na:K ratio of 24 were 79% (95% CI, 67-86%) and 100% (98%, CI, 97%-100%), respectively. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Na:K ratios of 27 or 28 identify the highest percentage of dogs with suspected mineralocorticoid and glucocorticoid deficiency correctly. In dogs with a Na:K ratio of 24 or less, the likelihood of confirming a diagnosis of HA with an ACTH stimulation test is high.

Patient History Report
Sorted by Patient ID

Patient: 16563-1 ASPROOLEE		Species: CANINE		Breed: POODLE, TOY	
Client: 16562 RAYMOND HALE		DOB: 12/14/1994		Sex: NEUTERED	
Date	Type	Staff	History		
2/21/2008	L	600	Chemistry results from IDEXX VetLab In-clinic Laboratory		
			Requisition ID: 13340	Posted	Final
			Test	Result	Reference Range
			Chloride =	105 mmol/L L	109 - 122
			Potassium =	5.4 mmol/L	3.5 - 5.8
			Sodium =	153 mmol/L	144 - 160

Sodium (153)/Potassium (5.4) = 28.33 Na:K ratio

Based on **CONCLUSIONS AND CLINICAL IMPORTANCE** above, Asproolee suffered from hypoadrenocorticism (Addison's Disease).

Unfortunately for him, none of the vets ever bothered to perform an ACTH stimulation test which would have saved his life!! The above blood work was performed by the clinic where he died!