تعين قيمة الـ ١٧ ـ استيرويدز والكورتيكو استيرويدز الكلية فى بول الكلاب السليمة والمريضة بأمراض جلدية

الأستاذ / الدكتور س. العمروسى والدكتور و. هوفمان

الملخص

عينت قيمة الـ ١٧ كيتو أستيرويدز والكورتيكو أستيرويدز الكلية فى عينات بول جمعت لمدة ٢٤ ساعة من ٢٧ كلب وكلبة • وقد كان خمس كلاب يقاسون من الأكزيما القشرية المزمنة وخمس كلاب أخرون يقاسون من تساقط شعر الجلد وسبع كلاب يقاسون من التهاب الجلد الأحمرارى القشرى المزمن •

وكانت كميات الـ ١٧ كيتو أستيرويدز والكورتيكو أستيرويدز منخفضة فى الكلاب المريضة من الجنسين والتى تقاسى من تساقط الشعر والتى تقاسى من الأكزيما • ولم تختلف الصورة فى الذكور اختلاف كبيرا •

وعلى العكس أزداد أفراز الـ ١٧ كيتو أستيرويدز والكورتيكو أستيرويدز فى حالات التهاب الجلد .

Faculty of Veterinary Medicine Justus Liebia University, Giessen
Dept. of Internal Medicine.

Head : **Prof. H. Eikmeir**

TOTAL URINARY 17-KETOSTEROIDS AND CORTICOSTEROIDS IN HEALTHY AND SKIN AFFECTED DOGS

(With one table)

By

S. El Amrousi and W. Hofmann*

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SUMMARY

17- ketosteroids and corticosteroids were estimated in 24 hours urinary sample of 27 male and female dogs. 10 dogs were clinically healthy. Five dogs suffered from eczema squamosa et crustacia chronica. Five dogs were affected with alopecia and seven with dermatitis erythmatosa squamosa et crustacia chronica.

Diseased dogs of both sexes suffering from alopecia and eczema had significant lower values of 17-ks and corticosteroids, but in the male dogs, the level of corticosteroids did not differ significantly. On the contrany, the excretion of both 17-ks and corticosteroids was increased in cases of dermatitis, however the differences between healthy animals and this group were clearly insignificant.

INTRODUCTION

The clinical significance of 17-ketosteroids (17-ks) as a group lies in the fact that they reflect androgenic activity. The 17-ks are found in the urine as water soluble conjugates of glucuronic acid (FRUNBAUM and PACE, 1968). On the other hand, 17-hydroxy-corticosteroids are considered as one of the important groups of adrenal cortical hormones.

During the routine work in the Veterinary clinic, at Giessen, a large number of dogs with a variety of skin diseases (Alopecia, eczema, different kinds of dermatitis) were subjected to cortisone and testesterone therapy. Some showed varying degrees of improvement. Such cases were often ascribed to endocrine dysbalance without attempting to determine the specific endocrine organ involved.

The present study was undertaken to establish more clearly the range of 24 hours steriod excretion by male and female dogs and the extent to which this excretion was modified by skin affections.

* = Dr. W. Hofmann, Med. Vet. Klinik, Faculty of Veterinary Medicine, Justus Leibig University, Giessen, West Germany.

MATERIAL AND METHODS

A total number of 27 dogs of different ages, breeds and sexes were subjected to total urinary 17-KS and corticosteroids analysis. Ten dogs were clinically healthy, and the rest (17) were affected with diffferent skin diseases. Of the affected dogs, five suffered from eczeme squamosa et crustecia chronica. Five dogs were affected with alopecia and seven dogs with dermatitis erythmatosa squamosa et crustacia chronica. In dogs suffereing from alopecia, the loss of hair was often bilateral with or without formation of scales and was accompanied by moderate changes in pigmentation.

The 24 hours urine was collected in plastic containers fixed at the side of the dogs cages. All animals were catherized at the beginning and the end of 24-hours period. Care measures were undertaken to obtain the urine sample as clean as possible. Urine was kept in amber colour bottels. Ten ml. conc. H Cl was used as a preservative and samples kept in the refrigerator until analysed.

The procedure adopted for the determination of the 17-KS was a modified method of ZIMMERMANN (1955). For corticosteroid estimation a modification method of the procedures advised by CHEN, WHEELER and FREEMAN (1953), RECKNAGEL and LITTERIA (1959) and IZZO, KEUTMANN, BURTON (1957) was adopted. Reagents for these assays were supplied as test kits by Clinton Laboratories (Los Anglos, California, USA). Instructions for hormone determination were strictly applied.

RESULTS

The results of chemical analysis are presented in Table 1. The urinary excretion of the neutral 17-KS in normal clinically healthy dogs was found to be 2.31 mg/24 hours for males and 2.03 mg. for females. For corticosteroids, the respective levels were 2.22 and 2.21 mg/24 hours in males and females respectively.

Diseased dogs of both sexes suffering from alopecia and eczema had significant lower values of 17-KS and corticosteroids with the exception of corticosteroids excretion in male dogs, where the level did not differ significantly from normal (Table 1). On the oontrary, the excretion of both 17-KS and corticosteroids was increased in cases of dermatitis. However, the differences between healthy animals and this group were clearly insignificant.

TABLE 1 : **Urinary 17-Ketosteroids & Corticosteroids in Healthy and Diseased Dogs**

	Females			Males		
	No.	17-KS	Cortico-steroids	No.	17-KS	Cortico-steroids
Clinically Healthy . .	4	2.03 ± 0.186	2.21 ± 0.413	6	2.31 ± 0.226	2.22 ± 0.274
Alopecia	3	0.77* ± 0.281	0.83* ± 0.223	2	1.10 ± 2.61	2.95 ± 2.65
Eczema	3	0.73* ± 0.351	0.98* ± 0.101	2	1.25 ± 0.050	0.92* ± 0.099
Dermatitis	3	2.82 ± 0.774	2.78 ± 0.384	4	3.69 ± 0.954	2.66 ± 0.745

± = Standard error
* = Statistically significant from normal values at 0.05 level of probability.

DISCUSSION

The normal values for 24 hours of 17-KS determined here were slightly higher than that reported by GLENN and HOFMANN (1951) and BOST and BLANDIN (1958). Still lower values, than one milligram, were given by DUFFY (1952) and BEDAERT (1953). The data of TEWELL and FREEMAN (1954) simulated the results here. These differences were most probably due to the fact that the extraction time in the above mentioned reports was limited to only few hours and not 24 hours as carried here. GLENN and HEFTMANN (1951), criticized such differences, especially that reported by PASCHKIS, CANTAROW, RAKOFF, and WALKING (1943), and by LAWRENCE 1949), to the interference of urinary pigments and chromogens other than 17-KS. In this study and by using the method adopted, the phenols, estrogens and other pigments were extracted from

the chloroform solutions with sodium hydroxide and discarded. The remaining ketosteriods were complexed with a special colour developer (the 17-KS reagent) with maximum absorption at 550 m/. In additton, this reagent was found to be more stable, gives lower blanks and developed about the same colour densities with both androsterone and dehydroisoandrosterone.

Female dogs excreted a substantial amount of corticosteriods in their urine. Spontanious daily variation was small enough, in the view of TEWELL and FREEMAN (1954), so that a significant increase or decrease in corticosteriods output may be recognized with reasonable accurancy. It wa found in this study that no significant differences of both 17-KS and corticosteriods existed between the two sexes. This simulated that reported by GLENN and HEFTMANN (1951) in their data concerning urinary KS excretion of dogs.

Dogs of both sexes suffering from alopecia and eczema had significant lower values of 17-KS and corticosteroids with the exception of corticosteroids excretion in male dogs where the level did not differ significantly from normal (Table 1). On the contrary, the excretion of both 17-KS and corticoteriods was increased in case of dermatitis. However, the differences betweeen healthy animals and this group were statistically insignificant.

The relation between the skin diseases encountered herein this investigation and endocrine secretions is lacking in the veterinary practice. The exact means by which adrenocortical hormone acts on the skin has not yet been elucidated (COFFIN and MUNSON, 1953). The possible biological mechanism responsible for the skin and hair changes may be explained on the basis that estrogen from the Sertoli cell tumour acts either directly on the skin (WILLIAMS, GARDNER and De VITA. (1949), or possibly in conjunction with adrenal-cortex, hormones in a synergistic effect (BAKER and WHITAKER, 1949), causing atorphy of the hair follicles and sebaceous glands and thining of the epithelium (MOSER, 1966). A second less likely possibility exists where estrogen probably acts either by slimulating the anterior pituitary gland which in turn stimulates the adrenal cortex, or by direct stimulation of the adrenal cortex. The skin changes according to this hypothesis, would be the result of augmented corticosterone. It is, however, known that the administration of corticosterone of C-11 oxygenated group in high doses causes breakdown in protein and loss of nitrogen by excretion (ENGEL, 1949).

Ablation of the adrenals is accompanied by a rapid increase in hair growth over normal, and accompanied by an appreciable increase in oxygen consumption of the skin. Thus, it would appear that the nitrogen of the skin is in some way diminished by adrenal cortex hormone.

Earlier clinical reports described the effect of hormonal therapy in such affections. EDGETT (1943) used with success oral administration of methyl testesterone (10 mg tablets) in a case of obstinate eczema in a dog. Similar cases were reported by HOSKINS, LACROIX and MAYER. (1959) and WITZIGMANN (1937) where the latter found, in senile male dogs, eczematous skin lesions in connection with the hypertrophy of the prostate gland. Although the determination of urinary 17-KS is quite popular in evaluating a case of possible hypogonadism, it has limited value in this instance (WILLIAMS, 1962). This is, in part, due to the wide variation occuring in normal excretion and the fact that approximately 70% of the 17-KS originate from precursors secreted by the adrenal cortex (WILLIAMS, 1962). Thus, in individual patients, the determination of 17-KS excretion does not indicate whether testesterone production is normal or deficient.

17-KS could be depressed by liver dysfunction which may accompany some cases of long standing eczema (WILLIAMS, 1962). Another view was given by NELSON and HARDING (1954), who explained that alteration of the blood supply to the liver and splenic injections of cortisone gave no clear evidence concerning the role of the liver in the metabolism of corticosteriods.

Interest in the relation between endocrine secretions and acne vulgaris in man is evidenced by abundance of reports in the literature. Most of these reports were reviewed by PELLARINEN and SONCK (1962). Interest is this area has stemmed from assumption that a 17-KS determination is a measure of androgen production, an increased excretion of urinary 17-KS in acne would indicate androgen over production (TOTH and NEKAM, 1968). However, it is now evident that the 17-KS are a rather poor index of androgenicity in that they are metabolities of adrenal cortical hormones which possess little androgenic patency (VANDE WIELE, Mac DONALD BALTE and LIEBERMAN. 1962 and HORTON, ROSENER and FORSHUM. 1963).

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Author's address : S. El Amrousi. *Dept. of Med. Fac. of Vet. Med. Assiut University.*