

## LEVELS OF VITAMIN E IN BLOOD SERUM OF HEALTHY AND DISEASED BALADY SHEEP IN UPPER EGYPT

By

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### SUMMARY

*A total number of 192 Balady ewes in Upper Egypt were selected from Sohag and Assiut Governorates to evaluate blood serum concentration of vitamin E in healthy and diseased conditions. The results showed that the mean values of vitamin E in blood serum ( $\mu\text{g } \%$ ) in clinically healthy ewes was significantly higher in young animals (3-4, 6, 8-12 months) than old mature animals (over one year). On the other hand, this vitamin was significantly reduced in ewes affected with acute and chronic pneumonia as well as those affected with acute and chronic enteritis at different ages if compared with the corresponding control animals. From the obtained data it was eventually clear that vitamin E must be added during the course of treatment of acute and chronic diseases in sheep.*

### INTRODUCTION

Vitamin E appears to be the first line of defense against per-oxidation of polyunsaturated fatty acids contained in cellular and subcellular membranes (Kaneko et al. 1997). In addition, the phospholipids of mitochondria, endoplasmic reticulum and plasma membranes possess affinities for  $\alpha$ -tocopherol and the vitamin appears to concentrate at these sites (Murray et al., 1993). In biological systems its function is primary as fat-soluble intracellular antioxidant and as antifree radical agent (scavenging free radicals that otherwise might react with unsaturated fatty

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acids to form toxic lipids of the cell membranes (Smith, 1996 and Kaneko et al. 1997). In addition, it plays an important role in the absorption of vitamin A and in the synthesis of vitamin C (Hoffmann, 1976).

The deficiency of vitamin E affects many organs and systems in the animal body including muscular, nervous, reproductive, cardiovascular and haematopoietic systems (Smith, 1996; Wang et al. 1996; and Radostiis et al 2000). Moreover, vitamin E plays an important role in the maintenance of immune system and even a marginal deficiency of this vitamin impairs the immune response (Finch and Turner 1996 and Beharka et al. 1997).

The updated information data on vitamin E concentration in ewes blood in healthy status as well as some diseased conditions will eventually provide a source of valuable information for veterinarians and those concerned with the management and health of ewes (Kaneko et al 1997).

The present work was oriented to study the level of vitamin E in blood serum of ewes in healthy state in Upper Egypt and in some digestive and respiratory diseases.

### **MATERIALS AND METHODS**

A total number of 192 Balady ewes were selected from Sohag and Assiut Governorates. Animals were classified equally into 4 groups, 48 each (3-4, 6, 8-12 months and over one year). After clinical examination, each group was sub-classified into five groups. The first (12 each) was proved healthy while the rest (36 each) was classified equally into 4 groups (9 each) including acute pneumonia, chronic pneumonia, acute enteritis and chronic enteritis at different ages.

Blood samples were collected from each animal by jugular vein puncture to obtain blood serum. The collected sera were used for determination of vitamin E according the method described previously by Hawks et al. (1954).

The results were subjected to ANOVA and expressed as mean  $\pm$ SD to differentiate between values of healthy control group according to different ages and also

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between diseased animals and their corresponding healthy control groups using software program (Prism, 1996).

## **RESULTS**

The results as seen in table 1 and figure 1, showed that the mean values of vitamin E in blood serum ( $\mu\text{g } \%$ ) in clinically healthy ewes at different ages were significantly higher in young animals than mature ones (over 1 year).

Concerning the level of vitamin E in diseased groups suffering from acute pneumonia, chronic pneumonia, acute enteritis and chronic enteritis at different ages, the values were generally significantly reduced if compared by the corresponding healthy animals. On the other hand, the reduction of the mean values of vitamin E in blood serum of ewes was more pronounced in most of acute cases in pneumonia or enteritis than in chronic cases.

## **DISCUSSION**

Vitamin E plays an important role in the body defense against pathogens by stopping the deleterious effects and stresses effects of the free radicals in the tissues (Murray et al., 1993). Consequently, evaluation of vitamin E in the blood takes great importance in judging the health condition of the animal and may be of value in treatment trials as an aid for diagnosis (Kaneko et al. 1997).

Results in the present work showed that the mean values of vitamin E in blood serum ( $\mu\text{g } \%$ ) in clinically healthy ewes was significantly higher in young animals than old mature ones. These results lie within the normal physiological limits previously reported by Kaneko et al. (1997) and Radostits et al (2000). The higher levels of vitamin E in young animals is directly related to the reservoir supplemented from their dams, meanwhile the lower level in older animals is coinciding with the consumption of this vitamin as an antioxidant against the various stresses (Elkoussi, 1996).

Reduction in the mean values of vitamin E in diseased groups either by acute pneumonia, chronic pneumonia, acute enteritis or chronic enteritis at different ages

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if compared by the corresponding healthy animals was more pronounced in acute cases either in pneumonia or enteritis than in chronic cases. These results more or less agreed with those reported by Omar (1997).

The suspected causes of the reduction of vitamin E during disease status in the present study may be multi-factorial. The most probable one is the use of this vitamin as the main antioxidant in the animal body against the free radicals which performed during disease process especially during its acute stages (Hoffmann, 1976 and Kaneko et al 1997). The consumption of this vitamin in the process of vitamin C synthesis as well as the synthesis of Co-enzyme Q may be additional factors (Hoffmann, 1976).

*The obtained data pointed to the recommendation of adding vitamin E during the course of treatment of acute and chronic diseases in sheep*

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### المخلص العربي

تم اختيار عدد ١٩٢ رأس من النعاج البلدية في صعيد مصر من محافظتي أسيوط وسوهاج لتقدير قيمة فيتامين E في الدم في الحالات لسليمة و المريضة. هذا وقد أظهرت النتائج أن مستوى فيتامين E في دم الخراف الصغيرة كان أعلى من مستواه في النعاج البالغة. ومن ناحية أخرى انخفض مستوى فيتامين E في الدم في الحالات المصابة بإصابات تنفسية أو معوية سواء كانت هذه الإصابات حادة أو مزمنة عن قرينتها في المجموعات الضابطة. وقد اتضح من النتائج إنه يجب تعديل مستوى فيتامين E في الأغنام أثناء الإصابة بالأمراض الحادة و المزمنة.

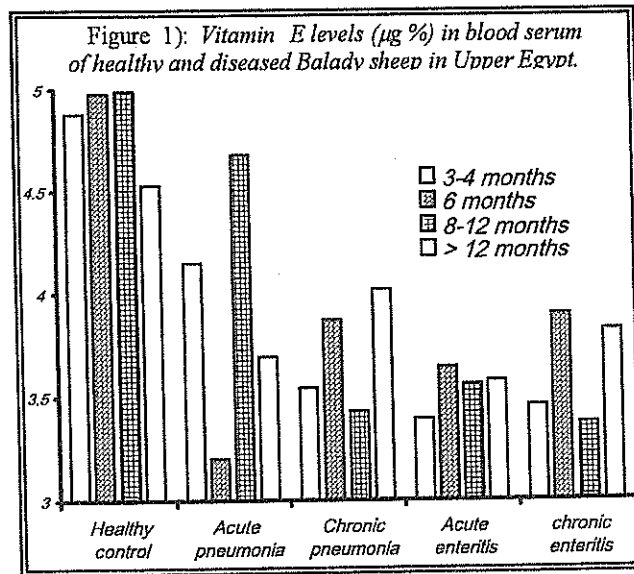


Table 1): Vitamin E levels ( $\mu\text{g} \%$ ) in blood serum of healthy and diseased Balady ewes in Upper Egypt

Group		3-4 months	6 months	8-12 months	Over 12 months
Healthy	Mean	4.88 <sup>a</sup>	4.98 <sup>a</sup>	4.99 <sup>a</sup>	4.53 <sup>b</sup>
	SD	0.69	0.60	0.58	0.48
	Range	3.80-6.60	4.11-5.71	4.14-5.93	4.14-5.78
Acute pneumonia	Mean	4.15*	3.70*	4.68*	3.69*
	SD	0.30	0.18	0.15	0.15
	Range	3.8-4.5	3.50-3.92	3.55-3.88	3.80-4.14
Chronic pneumonia	Mean	3.54*	3.87*	3.43*	4.02*
	SD	0.49	0.40	0.21	0.11
	Range	2.89-3.95	3.47-4.38	3.21-3.68	3.88-4.13
Acute enteritis	Mean	3.39*	3.64*	3.56*	3.58*
	SD	0.35	0.16	0.25	0.05
	Range	2.92-3.65	3.44-3.80	3.21-3.83	3.52-3.64
Chronic enteritis	Mean	3.46*	3.90*	3.37*	3.82*
	SD	0.34	0.46	0.32	0.16
	Range	2.89-3.89	3.38-4.44	2.94-3.62	3.64-4.02

<sup>a,b</sup>Values in the same row with unlike superscripts are significantly differing at  $P < 0.05$

\*Values in the same column are significantly differing from the control group at  $P < 0.05$

## **SOME STUDIES ON CHRONIC DIARRHEA IN DOGS**

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### **SUMMARY**

*This work was done on 18 adult dogs aged 4-7 years from both sexes, belonging to Dogs Department of Police Academy in Alexandria Governorate. Animals were classified into two groups where clinical, physical, parasitological, hematological and biochemical aspects of chronic diarrhea were studied. The study revealed the following:*

*1-Parasitological examination of feces recorded that the main cause of chronic diarrhea in dogs under investigation were toxocara Canis and giardia species.*

*2-- Clinical signs of chronic diarrhea were frequent defecation of oily , greasy and light watery feces, marked weight loss, dehydration, anorexia, increase in respiratory and heart rate*

*3-Hematological examination revealed significant increase in the values of total leukocyte count, neutrophils, monocytes and packed cell volume with significant decrease in the percentage of lymphocytes in diarrheic dogs.*

*4-Serum biochemical analysis revealed significant decrease in the values of serum total protein, albumin, cholesterol, calcium ions, sodium, potassium and chloride and significant increase in the activities and values of ALT, GDH, AP, urea nitrogen, bilirubin and anion gap in diarrheic dogs when compared with healthy dogs.*

*5-Blood gas analysis in diarrheic dogs showed significant decreases in the values of blood pH , PCO<sub>2</sub> and HCO<sub>3</sub> ( metabolic acidosis) and significant increase in the value of PO<sub>2</sub>.*

### **INTRODUCTION**

Since the very old ages, dogs have been controlled by man and trained to satisfy their desire. History show us that man used dogs for hunting, grading and other. People always found selvesteem when trained their dogs such as loyalty, friendship and safeness. Sometimes in the black ages, some of royal families considered breeding a certain kinds of dogs that they own a crime and death was the punishment.

Diarrhea is the classic sign of small intestine diseases. It exists when there is an increased frequency of passage of feces, and increased fluidity of feces with increased volume per day of both Stephen (1989).

Diarrhea in dogs is frequently a clinical manifestation of primary diseases in other systems of the body and leads to dehydration due to high loss of body fluids and electrolytes. So that, the animal become sick and weak and can not do its work, sometimes infectious diarrhea leads to death of the animals. The measurement of blood constituents during the course of diarrhea acts an aid for diagnosis and elucidate the consequence of the diarrhea on metabolic process and to study the effect of diarrhea on organ function.

The present investigation was planned to secure the following information:

- 1-The probable cause of chronic diarrhea in police dogs.
- 2-The clinical picture characterized for chronic diarrhea.
- 3-Throw some lights on the mean values of some hematological and biochemical parameters of the blood in clinically healthy dogs.
- 4-The effect of chronic diarrhea on some hematological and biochemical parameters of the blood.

## MATERIALS AND METHODS

### **1-Animals:**

A total number of 18 adult mixed dogs aged from 7-10 years belonging to Dogs Department of Police Academy at Alexandria Governorate were examined in this study and were divided into two groups. Group one: included 9 dogs (apparently clinically healthy dogs used as a control) The second group consisted of 9 dogs with chronic diarrheic signs.

### **2-Samples:**

Three blood samples were collected from all dogs under investigation by cephalic vein puncture. First sample was obtained into heparinized plastic syringes, the syringes were sealed, placed on an ice bag and sent directly to the laboratory for measuring blood pH, blood gases and bicarbonate concentration within 15-30 minutes. Second blood samples was obtained into glass vials containing EDTA for hematological examination. Third blood sample was collected into vacutainers tubes containing clot activator for harvesting serum for biochemical analysis.

### **3-Hematological examination:**

Determination of total and differential leukocytic count, erythrocytic count, hemoglobin content and packed cell volume were done according to Sastry (1985).



#### **4-Biochemical analysis:**

Serum levels of total protein, albumin, alanine aminotransferase activity (ALT), glutamate dehydrogenase activity (GDH), alkaline phosphatase activity (AP), glucose, total cholesterol, urea nitrogen, creatinine, bilirubin, phosphorus, calcium ions, sodium, potassium and chloride were determined calorimetrically using test Kit supplied by Boehringer Mannheim, Germany, K Labkit, and Data Medical Associated Inc. (DMA) according to the methods described by Peters, (1986), Doumans and Bigger (1972), Reitman and Frankel (1957), Trinder (1969), Watson (1961), Wybenga, et al; (1971), Husdan and Rapoport (1968), Sherlock (1957), Daly and Erthinghsausen (1972), Young (1990), Trinder (1951), Terri and Sesin (1958) and Schoenfeld (1964) respectively. The anion gap was calculated using the following formula according to Carlson (1989).

$AG = (Na+K) - (Cl+HCO_3)$ . Blood pH,  $PO_2$ ,  $Pco_2$ , and  $Hco_3$  values were determined by using an automatic gas analyzer ( ABL 30 Acid-Base Analyzer, Radiometer, Copenhagen, Denmark).

#### **5-Fecal examination:**

Fecal samples were examined for parasites using standard sedimentation in water technique followed by centrifugal flotation in saturated zinc sulfate and microscopy, by (Bugg, et al; 1999).

#### **6- Statistical analysis:**

Statistical analysis was performed using the statistical Analysis System (SAS, 1987).

## **RESULTS**

#### **History and clinical signs:**

A mixed breed dog suffered from chronic diarrhea for 1 month duration associated with frequent defecation. Feces appear oily, greasy and light in color. Dehydration, marked weight loss was obvious with periods of anorexia. On physical examination, dogs were thin and lethargic, their average temperature (38.6C?), heart rate (130 beats/min) and respiratory rate (30 breaths/min). Visible mucous membranes were pink colored.

#### **Fecal examination:**

Fecal examination revealed mixed infestation with *Toxocara Canis* and *Giardia* spp. Mean values of blood picture values including total and differential leucocytic counts, erythrocytic count, hemoglobin content and PCV in diarrheic and healthy dogs are given in table (1). The mean results of serum biochemical and blood gas analysis including total protein, albumin, globulin, ALT, GDH, ALP, Glucose, cholesterol, urea, creatinine, bilirubin, phosphorus, calcium ion, sodium, potassium, chloride and Anion gap and pH,  $PO_2$ ,  $Pco_2$  and  $Hco_3$  in diarrheic and healthy dogs are presented in tables (2,3).

## DISCUSSION

Diarrhea is categorized as chronic if it has been persistent (3-4 weeks or longer) or has a pattern of episodic recurrence. Chronicity generally excludes simple dietary indiscretion, intoxication, and viral enteritis as causes Birchard and Sheding (1994). Clinical signs of chronic diarrhea in this study included frequent defecation of oily, greasy, light colored feces, dehydration, marked weight loss and exhibition of periods of anorexia. These signs were correlated with those obtained by Birchard and Sheding (1994). Such clinical signs could be attributed to diarrheal fluid loss, electrolyte imbalance, chronic malabsorption and protein-losing enteropathy.

Data in table (1) showed hematological parameters in apparently normal and diarrheic dogs – where in clinically normal dogs are nearly similar to results of Drazner, (1989) and Kuehn, (1991). In Diarrheic dogs significant ( $P < 0.01$ ) increase in the values of total leucocytic counts, neutrophil % ( $P < 0.05$ ), monocytes and packed cell volume ( $P < 0.05$ ), and significant decrease in percentage of lymphocytes. These results were in agreement with those obtained by O'Brien, et al; (1995), Brooks and Watson (1997), Crowe, et al; (1997), Zafar, et al; (1999) and Lieb, (2000) and disagreed with Baatz (1992), who observed characteristic fall in leucocyte concentration in diarrheic dogs, leucocytosis which is characterized by neutrophilia, monocytosis and lymphopenia was probably due to chronic inflammation of intestinal mucosa probably with a superimposed stress, Kuehn (1991), and Birchard and Sheding (1994); while significant ( $P < 0.05$ ) increase in PCV value is indicative of hemococentration from fluid loss, Sheding (1988) and Carmalt, et al; (2000)

Biochemical analysis of normal and diarrheic dogs serum as recorded in table (2,3) showed that the measured parameters in apparently normal were nearly similar to the results obtained by Drazner, (1989), Kuehn, (1991), Arselan (2001). In diarrheic dogs there were significant decrease in the values of serum total protein, albumin, total cholesterol, calcium sodium, potassium and chloride and significant increase in the activities and values of ALT, GDH, ALP, urea nitrogen, bilirubin and anion gap, in comparison with clinically healthy dogs.

Hypoproteinemia and hypoalbuminemia in diarrheic dogs were correlated to the results obtained by Drazner, (1989), Sevelius (1995), and Brooks and Watson (1997). These results could be attributed to protein leaking through damaged intestinal mucous membrane and suggest the presence of a protein-losing enteropathy.

Hypocholesterolemia and hypocalcemia in diseased dogs were in agreement with the results obtained by Willard (1989). These findings indicate steatorrhea (i.e. inability to absorb fat to synthesize cholesterol and the vitamin D sterol molecule). Lorenz, (1980) stated that hypocholesterolemia in diarrheic dogs was perhaps to be the result of an intestinal malabsorption or maldigestion.

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Hyponatremia ( $P < 0.01$ ) in diarrheic dogs was in agreement with the results obtained by Cullen, et al; (1998) and can be attributed to decreased absorption of water and sodium from intestine in severe diarrhea.

Hypokalemia ( $P < 0.01$ ) in present study disagreed with the results obtained by Walker, et al; (1998) but agreed with the obtained by Hartmann and Reder (1995) and Brooks and Watson (1997) whose proved that hypokalemia may results from gastrointestinal loss during diarrhea. Hypochloremia ( $P < 0.01$ ) in diarrheic dogs disagreed with Stephen (1989) and could be attributed to poor appetite and salt-losing enteropathy in chronic diarrhea.

The anion gap was increased ( $P < 0.05$ ) significantly in diarrheic dogs and in these dogs the decrease in  $P_{CO_2}$  ( $P < 0.01$ ) with respect to the control dogs was greater than increase in the anion gap, suggesting that a mixed high anion gap normal gap (metabolic acidosis) Grove-white and white, (1999), was present due to both net loss of bicarbonate (normal gap acidosis) and the accumulation of acid (high gap acidosis).

Compared with the control dogs, the diarrheic dogs showed significant decrease in pH,  $P_{CO_2}$  and  $HCO_3$  concentration (table 3). These results were most likely attributable to mild metabolic acidosis (Nieman and Culter, 1995). Significant decrease of  $P_{CO_2}$  in diarrheic than control dogs, suggests partially or fully compensatory change in the metabolic acidosis where  $CO_2$  is lost through the pulmonary alveoli.

A marked increase ( $P < 0.05$ ) in activities of alanine aminotransferase (ALT), glutamate dehydrogenase (GDH) and alkaline phosphatase (ALP) in diarrheic dogs were conceded with the results obtained by Kitch, et al; (1994), Dodurka and Kraft (1995), Sevelius (1995) and Brooks and Watson (1997). These findings indicate a secondary liver disturbance in consequence of the intestinal disease, whereas the liver participation in secondary enteropathies is the effect of primary disease other than intestinal disturbances. Dodurka and Kraft (1995), Larry (1997) stated that the activities of ALT and ALP were increased in liver hypoxia due to hemoconcentration. Significant increase in urea nitrogen, recorded in diarrheic dogs, was consistent with Kato, et al; (2001) and may be attributed to dehydration that resulted from diarrhea Stephen (1989).

Hypobilirubinemia ( $P < 0.01$ ) in diarrheic dogs may suggest a secondary liver disturbance in consequence of the intestinal enteropathies. It could be concluded that, patients with chronic diarrhea require a specific diagnosis especially parasitological diagnosis. Serum biochemical profile should be considered to exclude metabolic or extraintestinal disorders that could cause or result from diarrhea. Calculation of anion gap in diarrheic patients can provide insight into nature of the change in acid-base balance, because the anions that cause change in anion gap are the same anions responsible for acid-base balance.

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Table (1): Blood picture values (mean  $\pm$  SE) of diarrheic and healthy dogs.

Variable Groups	Total leucocytes count $\times 10^3/\text{cm}^3$	Lymphocytes %	Neutrophils %	Mono-cytes %	Esinophil %	Total RBCs Count $\times 10^6/\text{cm}^3$	Hemoglobin Content g/ dl	PCV %
Control group	5.58 $\pm$ 0.19	31.22 $\pm$ 0.40	62.88 $\pm$ 0.37	2.88 $\pm$ 0.30	2.22 $\pm$ 0.14	6.85 $\pm$ 0.14	15.66 $\pm$ 0.21	40.33 $\pm$ 3.21
Diarrheic group	11.96** $\pm$ 1.71	22.66* $\pm$ 3.94	69.11* $\pm$ 4.85	6.55* $\pm$ 1.43	2.11 $\pm$ 0.42	6.90 $\pm$ 0.29	16.12 $\pm$ 0.72	46.88* $\pm$ 1.08

\* Significant at (  $P < 0.05$  )\*\* Highly significant at (  $P < 0.01$  )Table (2): Serum biochemical values (mean  $\pm$  SE) of diarrheic and healthy dogs.

Variable group	Total protein (g/dL)	Albumin (g/dL)	Globulin (g/dL)	ALT ( $\mu\text{L}$ )	GDH ( $\mu\text{L}$ )	AP ( $\mu\text{L}$ )	Glucose (mg/dl)
Control group	7.50 $\pm$ 0.14	3.99 $\pm$ 0.11	3.51 $\pm$ 0.07	19.66 $\pm$ 0.92	2.42 $\pm$ 0.11	77.88 $\pm$ 13.81	101.44 $\pm$ 1.94
Diarrheic group	6.58 $\pm$ 0.27	2.64** $\pm$ 0.23	3.94 $\pm$ 0.23	44.77* $\pm$ 8.77	10.70 $\pm$ 0.11	196.44 $\pm$ 54.66	102.88 $\pm$ 4.02

Table (2): Serum biochemical values.(continue)

Variable group	Cholesterol (mg/dl)	Urea nitrogen (mg/dL)	Creatinine (mg/dL)	Bilirubin (mg/dL)	Phosph. (mmol/L)	Calcium ion (mmol/L)
Control group	215.66 $\pm$ 5.22	25.33 $\pm$ 0.89	0.84 $\pm$ 0.03	0.15 $\pm$ 0.013	1.18 $\pm$ 0.14	1.62 $\pm$ 0.24
Diarrheic group	193.3* $\pm$ 6.66	50.22** $\pm$ 3.70	0.75 $\pm$ 0.10	0.19 $\pm$ 0.016	1.10 $\pm$ 0.04	1.27** $\pm$ 0.09

\* Significant at (  $P < 0.05$  )\*\* Highly significant at (  $P < 0.01$  )

**Table (3): Mean values (mean  $\pm$  SE) of serum electrolytes, anion gap and blood gases in the sera of diarrheic and healthy dogs.**

Variable group	Sodium (mEq/L)	Potassium (mEq/L)	Chloride (mEq/L)	Anion gap	pH	Pc o <sub>2</sub> (mmHg)	Po <sub>2</sub> <sup>-</sup> (mmHg)	Hc o <sub>3</sub> <sup>-</sup> (mmol/ L)
Control group	149.77 $\pm$ 0.49	4.04 $\pm$ 0.15	100.11 $\pm$ 0.53	26.51 $\pm$ 1.02	7.37 $\pm$ 0.15	50.72 $\pm$ 2.29	44.50 $\pm$ 3.16	27.18 $\pm$ 0.97
Diarrheic group	142.66** $\pm$ 1.75	2.98** $\pm$ 0.19	83.44** $\pm$ 3.64	38.85* $\pm$ 4.53	7.27** $\pm$ 0.25	41.94** $\pm$ 1.91	55.24* $\pm$ 4.25	23.35* $\pm$ 1.21

\* Significant at ( P<0.05)

\*\* Highly significant at (P<0.01)



## الملخص العربي

### بعض الدراسات عن الإسهال المزمن في الكلاب

#### على متولى

أُجرى البحث على عدد ١٨ كلب تتراوح أعمارها من ٤-٧ سنوات من كلا الجنسين، تتبع أكاديمية الشرطة لتدريب كلاب الحراسة - منطقة سيدى بشر - الأسكندرية . وقد قسمت هذه الكلاب إلى مجموعتين كل مجموعة تحتوى على ٩ كلاب.

المجموعة الأولى كانت سليمة ظاهرياً أما الثانية فكانت تعاني من إسهال مزمن لمدة شهر تقريباً حيث تم تسجيل الأعراض الإكلينيكية وقياس التغيرات الدموية والكيميائية وغازات الدم وأيضاً تم تحديد السبب الرئيسى المسبب للإسهال المزمن هذا وقد أثبتت الدراسة النتائج التالية:

كانت الأعراض الإكلينيكية للإسهال المزمن هي زيادة في تكرار عدد مرات التبرز (يحتوى البراز على دهون غير مهضومة أكسبته لون لامع) ، فقدان ملحوظ في الوزن والشهية ، جفاف وخمول ، زيادة معدل النبض والتنفس.

أثبت الفحص الطفيلي للبراز أن السبب الرئيسى للإسهال المزمن في هذه الكلاب هو الإصابة بديدان الإسكارس (*Toxocara Canis*) والجيارديا. (*Gardia spp.*)

أظهر الفحص المعملى لصورة الدم زيادة معنوية في العد الكلى للكرات البيضاء ونسبة العدلات (monocytes) وحيادات النواة (monocyt) وحجم الكريات المرصوصة (PCV) ونقص معنوى في نسبة الخلايا الليمفاوية.

أثبتت التحاليل البيوكيميائية لمصل الدم نقص معنوى في قيم البروتين الكلى ، الزلال ، الكوليسترول الكلى ، الكالسيوم ن الصوديوم ، البوتاسيوم والكلوريدات وزيادة معنوية في نشاط وقيم خَميرة الألائين أمينو ترانس فيريز (ALT) ، والجلوتاميت دي هيدروجينيز (GDH) والفوسفاتيز القاعدى (AP)، اليوريا النيتروجينيه والبيلروبين والأنيون جاب (Anion gap) في الكلاب المصابة بالإسهال المزمن مقارنة بالكلاب السليمة.

تبين من قياس غازات الدم أن هناك انخفاض معنوى في الأس الهيدروجينى (pH) ، غاز ثانى أكسيد الكربون والبيكربونات (metabolic acidosis) وزيادة معنوية في قيمة غاز الأوكسجين في الكلاب المصابة بالإسهال المزمن .