

STUDY ON NORMAL HEMATOLOGICAL VALUES
OF ARABIAN RACE HORSES

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SUMMARY

Hematological values for sixty clinically normal Arabian bred race horses of both sexes were estimated. Red cell count, hemoglobin concentration, packed cell volume, mean corpuscular volume, mean corpuscular hemoglobin concentration, white cell count, differential leukocytic count, total serum protein, albumin and globulin were determined by using several laboratory techniques. It appeared that the total serum protein and globulin were significantly higher in the stallions than those in mares ($P < 0.05$) whereas the results of other hemaltological parameters were comparable and the mean values did not show significant differences ($P > 0.05$).

INTRODUCTION

The blood picture of equine has developed a considerable interest in recent years. The estimation of normal hematological values are valuable as an assessment for the physiological fitness and diagnosis of the disease. (Steel and Whitlock, 1960; Jeffcott, 1974). The literature contains only a limited number of reports on the hematology of Arabian bred horses. Furthermore, there was no available data on the hemogram of Arabian race horse while there have been published many hematological

studies on the Thorough bred race horses. (Allen and Archer 1973, 1976; Stewart and Steel, 1974; Stewart *et al.*, 1977; Mason and Kowk, 1977). The present work was performed in order to determine a number of hematological parameters in the Arabian race horses which were divided into two groups of mares and stallions and to find the variations which may exist due to sex differences.

MATERIALS AND METHODS

Animal:

A sixty Arabian horses assembled in stables in the West of Baghdad were selected to be included in this study. The selection was based on sex and ages which ranged between 3-4 years. All of horses were under training for race purposes.

Sampling:

A 10 ml blood sample was collected from the jugular vein of each horse and dispensed in two tubes with and without anticoagulant (EDTA). Sampling were taken directly for immediate examination to the laboratory.

Haematological methods:

Total red cell counts (RBC) and white cell counts (WBC) were determined using a haemocytometer according to Coles (1980). Haemoglobin concentration (Hb) and packed cell volume (PCV) were estimated by using Spencer hemoglobinometer and microhematocrite centrifuge respectively. Mean corpuscular volume and mean corpuscular hemoglobin concentration were calculated. Differential leukocytic counts were made using Giemsa stained thin blood smear. Generally 300 white blood cells

were counted using a modified battlement counting technique (Schalm, 1975).

The serum was separated by centrifugation and stored at 20°C. for later chemical estimations. Total protein concentration was estimated by the Biuret method (Kachman, 1970) and measured in duplicate and analyzed by spectronic 20 photometer (Bouch and Lamb, U.S.A.). Albumin and globin was determined by electrophoresis on cellulose acetate strips using baritone buffer at PH 8.6 with ponceaus as stain for 10 minutes and acetic acid solution (5%) to wash them. Scanning of the clear bands was performed by achromoscan 200 (Joyce and Loeble, U.K). The data were analyzed statistically utilizing student's t-test to show the the differences between means of both groups of mares and stallions.

RESULTS

Results of the hematological values are summarized in Table 1, 2 and 3 which shows the mean and standard deviation (S.D) of the blood values for sixty Arabian race horses.

Analysis of the data revealed that there was no significant ($P > 0.05$) differences in the red cell count, packed cell volume, hemoglobin concentration, mean corpuscular volume, mean corpuscular haemoglobin concentration, white cell count and white cell differential count between stallions and mares. Total serum proteins and the globulin were significantly ($P < 0.05$) higher in stallions than those in mares.

DISCUSSION

Generally the mean values for RBC, Hb and MCV of these horses were similar with those reported for Thoroughbred race horses (Steel and Whitlock, 1960; Allen

Table 1: Mean and standard deviation of erythrocyte parameters of Arabian race horses.

Sex	Parameter	Erythrocytes (x 10 ⁶ /ul)	Hemoglobin (g/dl)	Packed cell volume(%)	Mean corpuscular volume (ft)	Mean corpuscular hemoglobin con- centration (%)
Mares	Mean	9.10	14.2	37.63	40.13	37.7
	± SD.	± 2.15	± 2.03	± 4.75	± 5.62	± 2.73
Stallions	Mean	8.71	13.8	37.14	42.6	37.2
	± SD.	± 1.9	± 1.65	± 4.4	± 4.64	± 2.2

Table 2: Mean and Standard deviation of total and differential leukocytic counts of Arabian race horses.

Sex	Parameter	WBC (10 ³ /ul)	Differential leukocytic count					
			Neutroph- ils (%)	Bands (%)	Lympho- cytis(%)	Monocytes (%)	Eosinoph- lis (%)	Basophils (%)
Mares	Mean	10.12	47.13	0.85	46.23	2.79	3.1	
	± SD.	± 0.183	± 7.45	± 0.86	± 7.43	± 1.19	± 1.82	0-1
Stallions	Mean	9.86	47.7	0.89	44.62	3.3	3.5	
	± SD.	± 2.19	± 8.42	± 0.93	± 8.85	± 2.75	± 1.59	0-1

Sex	Parameter	Absolute differential leukocyte count (per ul)		
		Neutroph- ils	Monocytes	Eosinophils
Mare	Mean	4850	260	324
	± SD.	± 1543	± 258	± 194.5
Stallions	Mean	4803	333.3	344.2
	± SD.	± 1504	± 231.7	± 179.3

Table 3: Serum proteins values of sixty Arabian race horses

Sex	Parameter	Total proteins (g/dl)	Albumin (g/dl)	Globulin (g/dl)	Albumin/globulin ratio
Mares	Mean	7.4	3.5	3.9	
	± SD.	± 0.6	± 0.5	± 0.5	0.9
Stallions	Mean	7.7	3.4	4.3	0.79
	± SD.	± 0.4	± 0.3	± 0.5	

and Archer 1973; Stewart and Steel 1974; Stewart *et al.*, 1977). the mean value for PCV was lower than in the previous reports but it agreed with the results obtained by Knil *et al.* (1969).

On the other hand, mean RBC, PCV, Hb, MCV and MCHC in the blood of both groups of Stallions and Mares were comparable and the mean values did not differ significantly ($P > 0.05$).

The total and differential leukocyte counts in the present work were similar to those reported for the Arabian horses (Hansen and Todd 1951; Knil *et al.*, 1969; Schalm *et al.*, 1975) and Thorough bred horses (Macleod *et al.*, 1947; Hansen *et al.*, 1950, 1951; Steel and Whitlock, 1960). There were no significant differences ($P > 0.05$) in the total and differential leukocytic counts for both females and males. Other finding in the differential white blood picture is that the neutrophil Lymphocyte ratio is nearly one and the Basophilis is a rare cell.

The mean values for the serum total proteins observed in the present study were in agreement with the accepted means values for healthy horses (Tasker, 1966). From Table 3, it can be noticed that the mean

corresponding level of Albumin serum concentration was 3.5 and 3.4 g/dl for both female and males respectively, which is similar to that of Thoroughbred reported by Mussman and Rubino (1970) and Stewart *et al.*, (1977), on the other hand, the total serum protein and the globulin were significantly higher ($P < 0.05$) in the stallions than those in mares.

In summary, effect of breed and sex on some of the hematological parameters were presented. However, it was determined from the present study that there was general agreement between the hemogram of pure bred Arabian horses and Thorough bred horses as reported in the literature.

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دراسة عن قيم الدم الليفية لخيل السباق العربية

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الخلاصة

تم تعيين قيم الدم المختلفة لستون من خيل السباق العربية
لكل الجنسين، وقد شملت الدراسة حساب خلايا الدم الحمراء، تركيز
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اللبومين والكلوبيلين وذلك باستخدام تقنيات مختبرية عديدة.
اظهرت الدراسة ان مجموع بروتين وكلوبيلين المصل اعلى بصورة
ملحوظة ($P < 0.05$) في الذكور عما هو في الاناث. بينما اظهرت
نتائج المؤشرات الدموية الاخرى انها متقاربة وان القيم الوسطية
(mean values) لم تظهر اي اختلاف ملحوظ احصائيا ($P > 0.05$)