

Evaluation study of the normal hematological parameters of donkeys in Baghdad city/ Iraq

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Abstract

The present study was aimed to determine the normal ranges (means \pm SE) of some hematological parameters (Packed Cell Volume, Hemoglobin, Erythrocyte Count, Mean Cell Volume, Mean Cell Hemoglobin, Mean Cell Hemoglobin Concentration, Leukocyte Count, Differential Leukocyte Counts {Relative and Absolute} and Platelets, of clinical healthy donkeys, by using 25 donkeys (11 males; 14 females) aged between 1-4 years in Baghdad city/ Iraq. The results showed that the average (mean) of these parameters in males and females were PCV 32.4-48.7% (39.01 \pm 1.53%), 31.6-45.9% (39.82 \pm 1.13%); Hb 9.6-14.3 g/dl (11.65 \pm 0.49 g/dl), 8.9-14.10 (11.82 \pm 0.36 g/dl); RBC 4.69-7.6 \times 10⁶cell/mm³ (6.06 \pm 0.26 \times 10⁶cell/mm³), 4.59-8.5 \times 10⁶cell/mm³ (6.29 \pm 0.25 \times 10⁶cell/mm³; MCV 58.9-70.1 fl (64.6 \pm 1.04 fl), 53.6-73.9 fl (63.7 \pm 1.72 fl); MCH 17.5-20.6 pg (19.29 \pm 0.33 pg), 16.6-21.7 pg (18.95 \pm 0.42 pg); MCHC 28.3-32.8 g/dl (29.86 \pm 0.36 g/dl), 28.2-30.9 g/dl (29.77 \pm 0.22 g/dl); WBC 5700-14100 cell/mm³ (10990 \pm 860 cell/mm³), 5400-15300 cell/mm³ (10821 \pm 800 cell/mm³); L. 1630-6612 (4186 \pm 423 cell/mm³) 1400-6800 (3423 \pm 410 cell/mm³); N. 2145-8897 (6077 \pm 683cell/mm³), 3296-10480 (6394 \pm 680 cell/mm³); M. 169-662 (415.7 \pm 47 cell/mm³), 126-469 (288.8 \pm 25 cell/mm³; E. 0-232 (39.27 \pm 26 cell/mm³), 0-192 (13.71 \pm 13 cell/mm³); B 0-399 (238.9 \pm 38 cell/mm³), 0-482 (231.3 \pm 31 cell/mm³) and platelets 258-1652 \times 10³ (582 \pm 119 \times 10³), 134-1240 \times 10³ (4712 \pm 73 \times 10³) respectively.

Key words: donkeys, hematological parameters, Hemoglobin, Platelets

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دراسة لبعض القيم الدموية الطبيعية في عدد من الحمير في مدينة بغداد/ العراق

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الخلاصة

هدفت الدراسة الحالية الى تثبيت القيم الدموية الطبيعية للحمير كحجم الخلايا لمضغوط وخضاب الدم وكريات الدم الحمراء ومعدل حجم الخلايا ومعدل تركيز خضاب الدم وعد خلايا الدم البيض وعدد الخلايا البيض التفرقي (النسبي والمطلق) والصفائح الدموية من خلال فحص 25 من الحمير السليمة سريريا (11 ذكر و14 انثى)، تراوحت اعمارها بين 1-4 سنوات في مدينة بغداد/ العراق. فاطهرت النتائج ان مديات هذه المعايير بلغت حجم الدم المضغوط 32.4-48.7% (39.01 \pm 1.53%)، 31.6-45.9% (39.82 \pm 1.13%)، خضاب الدم 9.6-14.31 g/dl (11.65 \pm 0.49 g/dl)، 8.9-14.10 g/dl (11.82 \pm 0.36 g/dl)، وكريات الدم الحمراء 4.69-7.6 \times 10⁶ كرية/مل (6.06 \pm 0.26 \times 10⁶ كرية/مل³)، 4.59-8.5 \times 10⁶ كرية/مل³ (6.29 \pm 0.25 \times 10⁶ كرية/مل³)، ومعدل حجم الكروي 58.9-70.1 fl (64.6 \pm 1.04 fl)، 53.6-73.9 fl (63.7 \pm 1.72 fl)، ومعدل خضاب الدم 17.5-20.6 pg (19.29 \pm 0.33 pg)، 16.6-21.7 pg (18.95 \pm 0.42 pg) ومعدل خضاب الدم 28.3-32.8 g/dl (29.86 \pm 0.36 g/dl)، 28.2-30.9 g/dl (29.77 \pm 0.22 g/dl) ومعدل خضاب الدم 5700-14100 cell/mm³ (10990 \pm 860 cell/mm³)، 5400-15300 cell/mm³ (10821 \pm 800 cell/mm³)؛ L. 1630-6612 (4186 \pm 423 cell/mm³) 1400-6800 (3423 \pm 410 cell/mm³)؛ N. 2145-8897 (6077 \pm 683cell/mm³)، 3296-10480 (6394 \pm 680 cell/mm³)؛ M. 169-662 (415.7 \pm 47 cell/mm³)، 126-469 (288.8 \pm 25 cell/mm³)؛ E. 0-232 (39.27 \pm 26 cell/mm³)، 0-192 (13.71 \pm 13 cell/mm³)؛ B 0-399 (238.9 \pm 38 cell/mm³)، 0-482 (231.3 \pm 31 cell/mm³) وعدد خلايا الدم البيضاء 258-1652 \times 10³ (582 \pm 119 \times 10³)، 134-1240 \times 10³ (4712 \pm 73 \times 10³)

مل³ 5400-15300 خلية/مل³ (10821 ± 800 خلية/مل³) واللمفية 6612-1630 (4186 ± 423 خلية/مل³) و6800-1400 (3423 ± 410 خلية/مل³) والعدلات 2145-8897 (6077 ± 683 خلية/مل³) و3296-10480 (6394 ± 680 خلية/مل³) وحيدة الخلية 169-662 (415.7 ± 47 خلية/مل³) والحمضات 0-322 (39.27 ± 26 خلية/مل³) و126-469 (288.8 ± 25 خلية/مل³) والقعدات 0-399 (238.9 ± 38 خلية/مل³) والصفائح الدموية 258-1652 × 10³ (582 ± 119 × 10³ خلية/مل³) و134-1240 × 10³ (471 ± 73 × 10³ خلية/مل³)

الكلمات المفتاحية: الحمير، المعايير الدموية، الصفائح.

Introduction

Veterinary clinical hematology is an important diagnostic methods in the practical veterinary medicine (1). However, there is few references about hamatological parameters in donkeys which had been documented in some African countries such as Egypt (2), Kenya (3), Nigeria (4) (5), Zimbabwe (6) and Ethiopia (7) and in other countries of Europe (8); also, blood parameters had been recorded in working equids (9). There are no blood parameters use as a references for Iraqi local breed donkeys therefore the present research was conducted.

Materials and Methods

Samples of blood was collected from the jugular vein by using the heparin tubes from 25 clinically normal donkeys (11 males and 14 females) aged 1-4 years in Baghdad city-Iraq. The blood used directly for complete blood picture (CBP) and used the Veterinary Scan system and stained the blood smear by Giemsa stain (10). The results were statistical analyzed by using SPSS (version 20) program by using ANOVA with a significant at level (P<0.05).

Results

The hematological values (ranges and means ±SE) in males and females respectively were recorded as follows:, PCV 32.4-48.7% (39.01±1.53%), 31.6-45.9% (39.82±1.13%); Hb 9.6-14.3 g/dl (11.65±0.49 g/dl), 8.9-14.10 (11.82±0.36 g/dl); RBC 4.69-7.6×10⁶ cell/mm³ (6.06 ±0.26×10⁶cell/ mm³), 4.59-8.5×10⁶cell/ mm³ (6.29±0.25×10⁶cell/mm³); MCV 58.9-70.1 fl (64.6±1.04 fl), 53.6-73.9 fl (63.7±1.72 fl); MCH 17.5-20.6 pg (19.29±0.33 pg), 16.6-21.7 pg (18.95±0.42 pg); MCHC 28.3-32.8 g/dl (29.86±0.36 g/dl), 28.2-30.9 g/dl (29.77±0.22 g/dl); WBC 5700-14100 cell/mm³ (10990±860 cell/mm³), 5400-15300 cell/mm³ (10821± 800 cell/ mm³); L. 1630-6612 (4186±423 cell/mm³) 1400-6800 (3423±410 cell/mm³); N. 2145-8897 (6077 ±683cell/mm³), 3296-10480 (6394±680 cell/mm³); M. 169-662 (415.7 ±47 cell/mm³),126-469 (288.8±25 cell/mm³); E. 0-232 (39.27±26 cell/mm³), 0-192 (13.71±13 cell/mm³); B 0-399 (238.9±38 cell/mm³), 0-482 (231.3±31 cell/ mm³) and platelets 258-1652×10³ (582±119×10³), 134-1240×10³ (4712±73×10³). There was no significant difference in males and females. In males and females The relative differential leukocyte count in normal donkey are presented in table (2), the monocyte was significantly increased in males than females. While, the absolute differential leukocyte counts in normal donkeys are presented in table (3), the monocyte was significantly increased in males than females.

Table (1) The hematological parameters for normal donkey; means \pm SE and ranges

Blood Parameters	Males (11)	Females (14)
Hematocrit (%)	32.40 - 48.70 39.01 \pm 1.53	31.60 - 45.90 39.82 \pm 1.13
Hemoglobin (g/dl)	9.60 - 14.30 11.65 \pm 0.47	8.90 - 14.10 11.82 \pm 0.36
Erythrocytes ($10^6/\mu$ L)	4.69 - 7.60 6.06 \pm 0.26	4.59 - 8.50 6.29 \pm 0.25
MCV (fl)	58.90-70.10 64.60 \pm 1.04	53.60-73.90 63.70 \pm 1.72
MCH (pg)	17.50-20.60 19.29 \pm 0.33	16.60-21.70 18.95 \pm 0.42
MCHC (g/dl)	28.30-32.80 29.86 \pm 0.36	28.20-30.90 29.77 \pm 0.22
Leukocytes/ μ L	5700-14100 10990 \pm 860	5400-15300 10821 \pm 800
Platelets ($10^3/\mu$ L)	258-1652 582 \pm 119	134-1240 471 \pm 73

Table (2) The relative differential white blood cells count in both sexes of donkeys

Differential White Blood Cells	Males (11)	Females (14)
	Average (mean \pm SE) (%)	
Lymphocytes	25.60-57.00 38.5 \pm 3.4	19.30-61.50 32.3 \pm 3.4
Neutrophils	33.00-68.00 54.7 \pm 3.9	74.60-35.00 62.2 \pm 3.3
Monocytes	2.40-4.70 3.6 \pm 0.22 A	2.10-3.50 2.7 \pm 0.14 B
Eosinophils	0-4 0.54 \pm 0.38	0-2 0.14 \pm 0.14
Basophiles	0-4 2.2 \pm 0.40	0-4 2.3 \pm 0.28

The different letters refer a significant ($P < 0.05$) differences.

Table (3) The absolute differential white blood cells count in both sexes of donkeys

Differential White Blood Cells	Males (11)	Females (14)
	Average (mean \pm SE) μ	
Lymphocytes	1630-6612 4186 \pm 423	1400- 6800 3423 \pm 410
Neutrophils	2145-8897 6077 \pm 683	3296-10480 6394 \pm 680
Monocytes	169-66 415.7 \pm 47A	126- 469 288.8 \pm 25B
Eosinophils	0-232 39.27 \pm 26	0-192 13.71 \pm 13
Basophiles	0-399 238.9 \pm 38	0-482 231.3 \pm 31

The letters A refers to significant differences ($P < 0.05$).

Discussion

The hematological parameters in present study in males and females of donkeys compared with previously studies concern the influence of sex (11, 12). The results of study of erythrocyte parameters RBCs, Hb, PCV, MCV, MCH, MCHC were disagree with results of many researchers there is no significant differences in both sexes compared with previous studies were showed that RBCs and MCV slightly increased in males than females but PCV lower in male, increase RBCs values due to exercise in work this lead to release of adrenaline and contract the spleen and release more RBCs in the blood circulation(13). No significant, according to sex, difference was established for the erythrocyte count in this study this agrees with the previous studies established (14). The result of study shows equal percentage of PCV values of male and female donkeys indicating no influence of the sex on the blood parameters in the donkey of our study, which confirms a previous study established (15). The total number of donkey leukocytes is the higher than other domestic animals (14, 16). Lower values were reported (17). However, the total and differential leukocytes counts of other species may be changed by factors such as pregnancy, lactation, nutritional status and age, (18). Also the study showed increased the blood parameters in donkeys more than other animals, the values of MCH and MCV in donkeys were similar to those in horses, but MCHC were high in horses than donkeys, the hemogram of the donkey in this study is more than horses (7, 18). Most of the hematological parameters of this study were agree with previous parameters of (18). The results of our study revealed increase in donkey basophils compared to other species that well explain the donkey high resistance to the diseases (14).

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