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SERUM BIOCHEMICAL AND HEMATOLOGICAL PROFILE OF MALE, FEMALE AND DIFFERENT AGE GROUPS OF KRISHNAVALLEY BREED OF CATTLE IN KARNATAKA

K.SRIPAD[*1], SHRIKANT KOWALLI[2] AND RAJU METRI[3]

[1]Deputy Director, Animal Disease Diagnostic Laboratory and Information Centre, Veterinary Hospital Compound, College Road, Belgaum 590002, Karnataka, India.
[2]Scientist -3, Animal Disease Diagnostic Laboratory and Information Centre, Veterinary Hospital Compound, College Road, Belgaum 590002.
[3]Veterinary Officer, Veterinary Dispensary, Kesti, Belgaum District.

ABSTRACT

Krishnavalley breed of cattle is an indigenous breed of black soil along the river basin of Krishna predominantly and also Ghataprabha, Malaprabha and Tungabhadra rivers in Karnataka. Present study was conducted at Belgaum and Koppal districts of Karnataka and describes the normal reference values of serum biochemical and hematological parameters in male, female and also in different age groups (0-3 years, 3-6 years and 6-9 years) of Krishnavalley breed of cattle. Fifteen blood samples each were collected from male and female and ten samples each were collected from different age group of animals, taking all aseptic precautions. Serum biochemical and hematological parameters were determined, statistically analyzed and set as reference values for male, female and different age groups of animals, which serve as baseline values for comparison of normal, various physiological, nutritional and deficiency conditions in male, female and also for different age groups of Krishnavalley breed of cattle.

KEYWORDS : Sexwise, agegroupwiswe, profile, Krishnavalley breed, Karnataka.

K.SRIPAD
Deputy Director, Animal Disease Diagnostic Laboratory and Information Centre, Veterinary Hospital Compound, College Road, Belgaum 590002, Karnataka, India.

***Corresponding author**

INTRODUCTION

India is a country with a rich diversity of livestock and varieties of cattle breeds. Indigenous cattle breeds are known for their resistance to infections and draught power besides their milch potential. But still under the banner of improvisation of the local breeds, cross breeding of exotic breeds has been going unabated across the country for several decades, due to which there is a gradual decrease in the population of the indigenous cattle breeds. Recently preservation of the local germ plasm has been given importance and attempts are being made to improvise the indigenous cattle breeds. Among the indigenous cattle breeds, Krishnavalley breed is one, which has a very good draught power and extensively used in farm practices and also fairly a good milch breed. This breed is native of black soil along the river Krishna mainly and adjoining areas of Ghataprabha, Malaprabha and Tungabhadra rivers in Karnataka. Hematological and biochemical profile being very important in the evaluation of the health status of animals, is a prerequisite for the in diagnosis of several pathophysiological, metabolic and nutritional disorders in cattle[1,2] . Not much of the information is available in the literature regarding the gender wise and age group wise hematological and biochemical values of Krishnavalley breed of cattle. Keeping these points in view, the present research study was undertaken with the objective of determining the reference values for hematological and serum biochemical parameters in males and females and also in different age groups of Krishnavalley breed of cattle.

MATERIALS AND METHODS

Study group of animals

The present study was carried out in Belgaum and Koppal districts of Karnataka. Fifteen male and 15 female apparently healthy adult Krishnavalley animals and thirty animals of different age groups (ten each for 0-3 years, 3-6 years and 6-9 years) formed the study group. These animals belonged to individual farmers of the above mentioned districts.

Collection of blood samples

About 10 ml of blood sample was collected aseptically from the jugular vein of each of these animals, in two sterile vacutainer tubes, one with heparin and other without. Blood samples were immediately transported on ice to the laboratory for analysis. Samples in plain vacutainer tubes were allowed to clot for three hours. Serum was separated[3] and stored in -20^{0}C deep freezer.

Laboratory Analysis

Biochemical parameters such as Serum Glutamate Oxalate Transaminase (SGOT), Serum Glutamate Pyruvate Transaminase (SGPT), Blood Urea Nitrogen (BUN), Serum Creatinine (CRE), Calcium (Ca), Phosphorus (P), Glucose (Glu), Alkaline Phosphatase (ALP), and Total Protein (T.Pro) were determined using ERBA Chem-5 plus V_2 semi automatic biochemical analyzer of Transasia Biomedicals Ltd. Standard biochemical kits suitable for the analyzer were made use of in the study. Parameters viz., total erythrocyte count (TEC), total leukocyte count (TLC), hemoglobin (Hb), packed cell volume (PCV), total platelet count (PLT), differential leukocyte count (DLC), Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH) and Mean corpuscular hemoglobin concentration (MCHC) were determined using ERMA PCE -210 (N) Hematology analyzer, Erma Inc, Tokyo. Standard biochemical kits suitable for the analyzer were made use off in the study.

Statistical analysis

Results were tabulated, Mean and Standard errors (SE) were calculated for each group and compared by Student's "t" test and ANOVA.

RESULTS AND DISCUSSION

Comparison between male and female

Mean and SE of the biochemical values for SGOT, SGPT, BUN, CRE, Ca, P, ALP, Glu and T.Pro of male and female Krishnavalley breed of animals are presented in Table I.

Table I
Mean ± SE of biochemical parameters in male and female Krishnavalley breed of cattle

Sl.No.	Parameters	Male (n=15)	Female (n=15)
1	SGOT(IU/L)	83.63 ± 2.96	88.53 ± 2.402
2	SGPT(IU/L)	39.01 ± 1.75	44.28 ± 2.92
3	BUN(mg/dl)	16.44 ± 0.58	15.44 ± 0.65
4	CRE(mg/dl)	1.58 ± 0.092	1.635 ± 0.053
5	P(mg/dl)	5.86 ± 0.14	5.80 ± 0.18
6	Ca(mg/dl)	10.15 ± 0.26	10.26 ± 0.19
7	ALP(IU/L)	125.20 ± 5.89	129.70 ± 6.48
8	Glu(mg/dl)	35.68 ± 2.26	34.64 ± 1.81
9	T.Pro (%)	6.35 ± 0.15	6.59 ± 0.13

The mean values of all the biochemical parameters of male and female Krishnavalley breed of animals did not differ significantly.

Mean and Standard Error (SE) of the hematological values for TEC, TLC, Hb, PCV, PLT, MCV, MCH, MCHC and DLC of male and female Krishnavalley breed of animals are tabulated in Table II. On comparing the means of all hematological parameters between male and female, the significant difference was noticed only in TLC, PCV, PLT and MCV, which were significantly higher in females. These findings viz., high TLC, platelet and PCV mean values, may support the fact that females have better resistance when compared to males.

Table II
Mean ± SE of hematological parameters in male and female Krishnavalley breed of cattle

Sl.No.	Parameters	Male (n=15)	Female (n=15)
1	TEC x 10^6	7.22 ± 0.33	6.81 ± 0.25
2	TLC x 10^3	11.79^a ± 0.67	14.41^b ± 0.60
3	Hb (g/dl)	9.84 ± 0.45	10.20 ± 0.45
4	PCV/Hct (%)	30.84^a ± 1.16	33.69^b ± 0.56
5	PLT x 10^3	205.00^a ± 10.13	243.00^b ± 14.61
6	MCV (fl)	43.36^a ± 1.58	50.45^b ± 2.01
7	MCH (pg)	13.86 ± 0.6790	15.20 ± 0.7352
8	MCHC (%)	32.02 ± 1.257	30.39 ± 1.481
9	Differential count		
	N (%)	27.60 ± 0.81	27.93 ± 1.10
	L (%)	67.27 ± 0.60	66.40 ± 1.09
	E (%)	4.60 ± 0.49	4.33 ± 0.49
	M (%)	1.50 ± 0.29	1.00 ± 0.10
	B (%)	1.00 ± 0.05	1.50 ± 0.05

Different superscript indicates significant difference (P ≤ 0.05)

Comparison between different age groups

Mean and Standard Error (SE) of the biochemical values for SGOT, SGPT, BUN, CRE, Ca, P, ALP, Glu and T.Pro of 0-3 years, 3-6 years and 6-9 years age group of Krishnavalley breed of animals is presented in Table III.

Table III
Mean ± SE of biochemical parameters in different age groups of Krishnavalley breed of cattle

Sl.No.	Parameters	0-3 years (n=10)	3-6 years (n=10)	6-9 years (n=10)
1	SGOT(IU/L)	93.92 ± 3.64	87.04 ± 3.58	85.51 ± 3.29
2	SGPT(IU/L)	36.71 ± 3.44	40.07 ± 2.60	44.97 ± 3.36
3	BUN(mg/dl)	14.46 ± 1.02	16.37 ± 0.95	15.78 ± 0.57
4	CRE(mg/dl)	1.67 ± 0.11	1.53 ± 0.12	1.75 ± 0.06
5	P(mg/dl)	6.05 ± 0.17	5.76 ± 0.22	5.77 ± 0.22
6	Ca(mg/dl)	10.18 ± 0.31	10.17 ± 0.23	10.06 ± 0.30
7	ALP(IU/L)	139.90 ± 7.44	120.5 ± 7.88	117.5 ± 7.11
8	Glu(mg/dl)	36.61 ± 3.11	34.70 ± 2.47	33.91 ± 2.01
9	T.Pro (%)	6.622 ± 0.20	6.462 ± 0.17	6.500 ± 0.19

The mean values of all the biochemical parameters of 0-3 years, 3-6 years and 6-9 years age groups of Krishnavalley breed of animals did not differ significantly.

Mean and Standard Error (SE) of hematological values for TEC, TLC, Hb, PCV, PLT, MCV, MCH, MCHC and DLC of different age groups of Krishnavalley breed of animals are tabulated in Table IV.

Table IV
Mean ± SE of hematological parameters in different age groups of Krishnavalley breed of cattle

Sl.No.	Parameters	0-3 years (n=10)	3-6 years (n=10)	6-9 years (n=10)
1	TEC x 10^6	7.32 ± 0.33	7.067 ± 0.38	6.76 ± 0.40
2	TLC x 10^3	13.88^a ± 0.86	13.65^a ± 0.87	10.99^b ± 0.71
3	Hb (g/dl)	9.60 ± 0.74	9.93 ± 0.51	9.43 ± 0.47
4	PCV/Hct (%)	31.23 ± 1.26	33.12 ± 1.65	32.27 ± 0.68
5	PLT x 10^3	199.20 ± 14.60	227.1 ± 18.38	218.90 ± 12.77
6	MCV (fl)	43.18 ± 2.15	47.36 ± 1.85	49.18 ± 3.05
7	MCH (pg)	13.24 ± 1.06	14.19 ± 0.58	14.12 ± 0.61
8	MCHC (%)	31.18 ± 2.71	30.03 ± 0.70	29.29± 1.43
9	Differential count			
	N (%)	26.70 ± 0.67	25.60 ± 0.79	29.10 ± 1.92
	L (%)	68.60 ± 0.97	66.60 ± 1.05	67.10 ± 1.93
	E (%)	4.600 ± 0.56	6.50 ± 0.65	3.70 ± 0.58
	M (%)	1.00 ± 0.10	1.33 ± 0.21	1.25 ± 0.10
	B (%)	1.00 ± 0.10	1.25 ± 0.25	1.00 ± 0.21

Different superscript indicates significant difference (P ≤ 0.05)

Comparison of means of hematological parameters between different age groups of Krishnavalley breed of animals, did not reveal any significant difference except mean TLC value, which decreased with the increase in the age of the animal. Mean TLC value of 6-9 years age group of animals was significantly lower when compared to 0-3 years and 3-6 years age group of animals. This could be attributed to cellular senescence and probably this is the reason which makes the older animals more susceptible to infection[4]. In the present study, we have adopted the approved and standard procedures for estimation of hematological and biochemical values, which are the tools for assessment of normal health, various physiological status, diagnosis of nutritional deficiencies or metabolic disorders and also for interpretation of laboratory results. Any deviation from the normal range, is defined as pathological[5]. The hematological and biochemical values may vary with the gender, age of the animal and physiological status of the animal. For this purpose gender wise and age group wise hematological and serum biochemical reference values for a particular species or breed is a basic requirement. These values may vary with the climatic, geographical and environmental conditions[6]. The hematological and serum biochemical values reported in the present study can serve as the reference value /

baseline data for male and female Krishnavalley breed of animals and also for 0-3 years, 3-6 years and 6-9 years age groups of Krishnavalley breed of animals, for the reasons such as (a) in the present study blood samples were collected from good number of apparently healthy Krishnavalley breed of animals of different gender and age groups and also from different geographical areas, without any clinical or pathological manifestations. (b) Perusal of literature did not provide any information on the hematological and biochemical profile of the Krishna valley breed of cattle for male, female and for different age groups of animals and (c) to the best of our knowledge, our report appears to be the pioneer report of hematological and serum biochemical profile for the Krishnavalley breed of cattle in Karnataka for different gender and age groups. Hence these values can serve as reference value / baseline data for Krishnavalley breed of animals and the same can be made use of in future.

CONCLUSION

The hematological and serum biochemical values reported in the present study for male and female and different age groups, may serve as reference values for Krishnavalley breed of cattle for respective groups, based on which the hematological and biochemical alterations due to physiological status, pathological conditions, metabolic disorders and nutritional deficiencies could be compared for diagnostic and / or therapeutic purpose.

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