

Probing Normal Biochemical and Hematological Indices of Barela & Marecha Camel Breeds Kept in Thal Desert

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ABSTRACT

Assessment of biochemical and hematological parameters in animals as well as humans is marked as a revolution in the diagnosis techniques. Healthy populations of certain areas are sampled to build normal reference values. To find out any ailment, analysis reports are compared with these values. In the case of camels (*Camelus dromedarius*), data regarding these indices is insufficient. To ascertain a normal hematology and serum biochemical reference range, current study involved 150 adult camels of Barela and Marecha breeds reared in Thal desert. Blood and serum samples were collected aseptically. White blood cells, (lymphocytes, monocytes, granulocytes) red blood cells, hemoglobin, hematocrit, platelets in blood while iron, sodium, calcium phosphorus, magnesium, potassium, creatinine, urea, ALT, AST and glucose in serum were evaluated. Platelets and glucose were found significantly lower in Marecha than the Barela breed. This study provides preliminary data for further investigations involving different ecological regions in the country, sex and management practices to establish a normal range of hematological and biochemical profiling.

Keywords: Barela; Camel; Hematology; Marecha; Normal reference value; Serum biochemistry; Thal desert

INTRODUCTION

Investigation of different blood and serum constituents has become an important diagnostic tool in human and as well as veterinary medicine throughout the world. Deviation of certain blood parameters from the normal picture of an animal can be an indication of the disease condition. It can also help in the differential diagnosis. It has been observed that fundamental knowledge of serum metabolites and hemogram of *camelus dromedaries* helps in understanding the physiology of the species. These tests also help in the differentiation of normal state and stress, which may be environmental, physical, or nutritional (Jalali et al.).

In order to estimate any ailment, data received from the biochemical and hematological analysis is compared with normal reference values which are obtained from clinically healthy animals (Zhang et al.). This serves as a yardstick for a clinician in disease diagnosis and hence better treatment. Since a variety of factors like age, nutrition, sex, exercise, breed, and even seasonal variations can affect the normal range of these values that is why reference values reported abroad are less useful in our local environmental conditions. Moreover, literature concerning these values of camels in desert areas of Pakistan is scanty, so results of blood and serum parameters are usually compared with those reference values which are reported in varying ecological conditions from different regions of the world (Lamo et al.).

Camels (*Camelus dromedarius*) play a vital role in the socio-economic life of people in desert areas (Islam et al.). It is the most well-adapted livestock species which survives and produces in climatic extremes and is well appreciated for its significance in the pastoral economy of Pakistan. Camels are raised in remote areas like deserts, arid, and other rain-fed or hard climatic areas of the country, where very few advisory and veterinary services exist due to which they remain exposed to a large number of diseases. So far, this species was neglected by researchers and development planners (Faye et al.).

There are two major breeds of one-humped camel in Punjab, Pakistan named (a) Barela and (b) Marecha. The first one is commonly found in the Thal region of district Mianwali, Khushab, Bhakkar, and Layyah. The current study was carried out in the district Mianwali, part of Thal, which is the third largest desert of Pakistan, located in the province of Punjab. This area has extreme weather conditions, minimum rainfall, and a diverse ecology covering almost 20,000 km.

OBJECTIVES

To collect baseline data and compare the normal reference range of serum biochemical and hematological indices from two breeds of adult camels reared in Thal desert (32.2773° N, 71.5546° E), Mianwali, Punjab, Pakistan.

METHODOLOGY

A total of 150 adult camels (75 Marecha and 75 Barela) ranging from 4 to 12 years of age, irrespective of gender, were sampled in this study. Samples were collected from clinically healthy animals throughout the year. Initially, each healthy animal was tested for different diseases like brucellosis, tuberculosis, hemo, endo, ectoparasites and mastitis (in the case of females). On attaining negative lab reports, 10 ml of blood was drawn aseptically from the jugular vein of each animal by using a disposable syringe. Half of the blood (05 mL) was shifted in screw-capped tubes containing 0.5 ml of 1% ethylene diamine tetra acetate (EDTA) solution as an anticoagulant and the remaining 05 mL to silicon-coated vacuum containers. On reaching at District Diagnostic Laboratory for Livestock Mianwali, the samples were immediately subjected to biochemical and hematological processing (Farooq et al.).

Different serum constituents were analyzed spectrophotometrically (Robert Riele KG Berlin Photometer 5010 V5+ Software version 6.7) using commercial reagent kits (Chema diagnostic kits by Grasa Laboratory Supplies (GLS) Lahore, Pakistan) While, blood parameters were measured through a Hematological analyzer Mythic™ 18 Vet by Orphee, Switzerland. Results were calculated by arithmetic mean \pm Standard error of the mean (SEM) using SPSS software version 20.

RESULTS

The present study may be the first to determine such a wide range of blood and serum parameters of camels in Pakistan. A non-significant difference in normal serum iron and glucose values was found between the two camel breeds as iron was lower and glucose was slightly higher in Barela. However, values of all other indices were the same in both breeds (Table 01).

White blood cells (WBCs), monocytes (MON), monocyte percentage (MON %), red blood cells (RBCs), hemoglobin (HGB), and hematocrit (HCT) were found slightly higher while low platelets (PLT) were recorded in Marecha as compared to Barela breed respectively (Table 02).

Table 1. Mean (\pm SEM) values of biochemical serum concentrations in Barela and Marecha breeds of camels (*Camelus dromedarius*).

Serum Constituents	Unit	Camel Breeds	
		Barela	Marecha
Iron	ug/dL	107.4 \pm 3.39	107.5 \pm 3.41
Sodium	mmol/dL	151.4 \pm 0.97	151.4 \pm 0.97
Calcium	mg/dL	10.3 \pm 0.11	10.3 \pm 0.11
Phosphorus	mg/dL	4.30 \pm 0.06	4.30 \pm 0.06
Magnesium	mg/dL	2.53 \pm 0.05	2.53 \pm 0.05
Potassium	mg/dL	6.11 \pm 0.09	6.12 \pm 0.09
Creatinine	mg/dL	0.503 \pm 0.02	0.503 \pm 0.02
Urea	mg/dL	53.92 \pm 0.39	53.92 \pm 0.39
ALT	U/L	19.03 \pm 0.12	19.03 \pm 0.12
AST	U/L	125.5 \pm 0.24	125.5 \pm 0.24
Glucose	mg/dL	105.6 \pm 1.5	105.4 \pm 1.6

Table 2. Mean (\pm SEM) hematological parameters in Barela and Marecha breeds of camels (*Camelus dromedarius*)

Parameters	Unit	Camel Breeds	
		Barela	Marecha
WBCs	$\times 10^3$ /uL	12.87 \pm 1.13	12.89 \pm 1.13
LYMP	$\times 10^3$ /uL	7.11 \pm 0.61	7.11 \pm 0.61
MON	$\times 10^3$ /uL	0.90 \pm 0.17	0.92 \pm 0.17
GRA	$\times 10^3$ /uL	5.38 \pm 0.86	5.38 \pm 0.86
LYMP %	25-50 %	59.34 \pm 1.44	59.34 \pm 1.44
MONO %	2-6 %	6.41 \pm 0.21	6.43 \pm 0.21
GRA %	%	34.22 \pm 1.49	34.22 \pm 1.49
RBCs	$\times 10^6$ /uL	19.01 \pm 10.04	19.38 \pm 10.05
HGB	g/dL	8.56 \pm 0.28	8.57 \pm 0.28
HCT	%	21.32 \pm 1.01	21.34 \pm 1.01
MCV	um ³	44.19 \pm 1.68	44.19 \pm 1.68
MCH	pg	20.86 \pm 1.09	20.86 \pm 1.09
MCHC	g/dL	46.75 \pm 1.77	46.75 \pm 1.77
RDW	%	17.27 \pm 0.91	17.27 \pm 0.91
PLT	$\times 10^3$ /uL	234 \pm 22.65	233 \pm 22.66
MPV	um ³	5.79 \pm 0.12	5.79 \pm 0.12
PCT	%	0.15 \pm .02	0.15 \pm .02
PDW	%	26.99 \pm 1.92	26.99 \pm 1.92

CONCLUSION

Limited number of published studies on normal hematological and biochemical values are available for camels in Pakistan which is why comparisons are made either with foreign countries or values quoted by certain books.

Current investigation revealed normal range values of camels reared in desert Thal and variations in these parameters between two breeds of camels. The findings obtained in this study provide a base for further research on normal range values using different factors like age, sex, husbandry practices, and ecological conditions in Pakistan.

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