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Haematological and Blood Chemistry Values in Red Fox (*Vulpes vulpes*) from Ladakh, India

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ABSTRACT

Background: Red fox (*Vulpes vulpes*) is a pervasive carnivore species across most of Eurasia and parts of North Africa. The current study was aimed to evaluate baseline values for selected haematological and biochemical variables for red fox in Ladakh, India.

Methods: Blood samples were collected from a female red fox with a drug combination of Xylazine and Ketamine. Selected haematological and biochemical variables were assessed for red fox in Ladakh, India.

Result: The total leucocytic count was found as 6.37 10^3/uL, Differential Neutrophil count was found as 4.86 10^3/uL, absolute lymphocyte count, monocytes, eosinophil and basophils were found as 1.08 10^3/uL, 0.42 10^3/uL, 0 10^3/uL and 0.01 10^3/uL respectively. Differential count for neutrophil lymphocytes, monocytes, eosinophil and basophils were found as 76.1%, 17%, 6.6%, 0.1% and 0.2% respectively. Total erythrocytic count was found as 8.710^6/uL, hematocrit as 12 g/dL, mean corpuscular volume was 47.4 fL and platelet as 212 10^3/uL. Serum biochemical analysis revealed serum glutamic-oxaloacetic transaminase/ aspartate aminotransferase as 316 U/Lt, serum glutamic-pyruvic transaminase/alanine aminotransferase as 260 U/Lt and alkaline phosphatase as 46 U/Lt.

Key words: Biochemistry, Haematology, Physiological parameters, Red fox.

INTRODUCTION

The red fox (*Vulpus vulpus*) is regarded as the most pervasive carnivore species in the world. It is found across a vast geographic distribution range that extends from the Arctic to sub-tropical regions (Hoffmann and Sillero-Zubiri 2016). In India, it is distributed across the Himalayan and Trans-Himalayan ranges in the north and the desert region in the north-west (Hoffmann and Sillero-Zubiri 2016; Reshamwala *et al.* 2021). Habitat alterations, invasion of dogs and increasing road traffic have been identified as the major threats faced by the red fox in India (Reshamwala *et al.* 2021)

Haemato-biochemical values are essential for understanding the health status of an animal (Etim *et al.* 2014). Information on haemato-biochemical parameters for red fox is rather limited in India and hence this study was aimed at documenting baseline values for selected haematological and biochemical variables in red fox in Ladakh, India.

MATERIALS AND METHODS

Three and a half-years-old (approximate age) non-pregnant female red fox with a body weight of 5 kg was rescued from Lamayuru village in Leh district and brought to the Rescue and Rehabilitation Centre in Leh town, Ladakh, India. The animal was physically captured by hand and immobilised using Xylazine (XylaMed® @ 1mg/kg intramuscular) along with Ketamine HCl (Vetalar® @10mg/kg IM). The animal showed signs of induction within six minutes of receiving the injection of the abovementioned drug mixture. The blood (5 ml) was collected from the left saphenous vein under aseptic conditions. Samples were preserved in anticoagulant tubes for haematology and clot activator tubes (Becton, Dickinson and Co., Rutherford, New Jersey 07070, USA) for biochemical analysis. The anaesthesia was reversed using Yohimbine (Yohimbe ® @0.125mg/kg that was administered in a single dose intramuscularly. Observations on physiological parameters such as body temperature, pulse rate and dentition were also recorded.

The blood sample was analysed for various blood parameters including white blood cell count (WBC), red blood cell count (RBC), Neutrophils, Lymphocytes, Monocytes, Eosinophils, Basophil, Platelet Count (PLT), Hemoglobin (Hb), Packed cell volume (PCV), Mean Corpuscular Volume (MCV), mean corpuscular haemoglobin (MCH), Mean corpuscular haemoglobin concentration (MCHC), red blood cell distribution width (RDW-CD), red cell distribution width standard deviation (RDW-SD), mean platelet volume (MPV), platelet distribution width (PDW), Plateletcrit (PCT). Serum biochemistry analysis was also done for various parameters such as blood urea, creatinine, billirubin, serum glutamic-oxaloacetic transaminase (SGOT)/ aspartate aminotransferase (AST), serum glutamic-pyruvic transaminase (SGPT)/alanine aminotransferase (ALT) and alkaline phosphatise.

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The haematological parameters were analysed using Sysmex XE-2100® and the blood chemistry was done using Microlab 300®chemistry analyzer with chemistry reagent kits by Ecoline® - Merck international.

RESULTS AND DISCUSSION

The respiration rate was 18 breaths per minute, body temperature was 37°C with a pulse rate of 65 beats per minute. No complications were observed during and after the procedure. The dental check-up revealed healthy and intact teeth with bright and shining canine teeth. The animal was physically captured for examination after it was brought to the rescue centre. The animal was injured with paraplegia, which may lead to some deviated values in blood chemistry and haematological parameters. The haematological values and serum biochemical values are provided in Table 1 and Table 2 respectively.

The results obtained for haematological and selected biochemical values obtained in the study were compared with the values as per Species 360 (formerly the International Species Information System or ISIS) standard (Reference number Apr.2008./ISIS/MedARKS/5.51). The absolute Leucocytic count, Neutrophils, Lymphocytes, Monocytes, eosinophils, basophils, RBC, HGB, MCV were found to be within the normal range as per Species 360 standard. The reported value of the platelet count was found to be lower than the reference range. This could be due to bleeding under the skin (in abdomen or groin region) because of an assumed collision with a vehicle that resulted in the paraplegia. For the serum biochemical value SGPT/ALT and Alkaline phosphatise were found to be within reference value but SGOT/AST was higher than the reference value, which might be due to tissue injury (Kreeger *et al.* 1990).

Table 1: Haematological values of red fox.

Parameter	Unit	Result	Reference range
WBC	10^3/uL	6.37	2.5-11.2
Neutrophils	10^3/uL	4.86	0.550-7.31
Lymphocytes	10^3/uL	1.08	0.155-4.290
Monocytes	10^3/uL	0.42	0.000-0.624
Eosinophils	10^3/uL	0	0.001-3.007
Basophils	10^3/uL	0.01	0.000-0.061
Neutrophils	%	76.1	
Lymphocytes	%	17	
Monocytes	%	6.6	
Eosinophils	%	0.1	
Basophils	%	0.2	
RBC	10^6/uL	8.7	8.18-11.00
HGB	g/dL	12	13.9-18.9
HCT	%	41.2	
MCV	fL	47.4	38.7-55.7
MCH	Pg	13.7	
MCHC	g/dL	29	
RDW-CV	%	16	
RDW-SD	fL	27.8	
PLT	10^3/uL	212	243-660
MPV	fL	9.9	
PDW		14.3	
PCT	%	0.21	

Table 2: *Biochemical parameters of red fox.*

Parameter	Unit	Result	Reference value
Blood urea	mg%	53	
Creatinine	mg%	0.6	
Billirubin	mg%	1.4	
SGOT/AST	U/Lt	316	9-160
SGPT/ALT	U/Lt	260	10-607
Alkaline phosphatase	U/Lt	46	19-249

CONCLUSION

There are no previous studies on haematological and biochemical values of Red fox (*Vulpes vulpes*) from Ladakh. The haematological and biochemical values in the study have been referenced for the first time for Red fox (*Vulpes vulpes*). The study is based on study on a single individual and does not account for variations within sub-populations, age, sex, subspecies or external factors such as weather and living condition. A larger sample size would be advantageous to make the results more insightful.

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