

Haematological reference intervals for Indian Leopards (*Panthera pardus*)

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Introduction

The determination of haematological value is useful for understanding the state of animal health. Normal blood values in different classes of domestic and pet animals are adequately available. Considering the endangered categories of red data book, the study of leopard of Indian native is very meagre; hence the base line information on haematological parameters as a reference value was aimed for the study.

Materials and Methods

Nine leopards (four males and five females) were included in the study. These animals were located at four major zoological gardens of Gujarat state viz., Kamala Nehru Zoological Gardens, Ahmedabad; Sayajibaug zoo, Baroda; Sakkarbaug zoo, Junagadh and Pandit Dindayal Upadhyay Prani Udyan, Rajkot.

General body conditions like alertness, body coat, gait, posture and physical status were assessed and recorded for individual animals. Simultaneously, physical parameters such as rectal temperature (Fahrenheit oF), pulse rate per minute and respiration rate per minute were also recorded before collection of biological samples, when the animal was restrained in the squeeze cage. During the study no changes were made in the routine diet regime and other husbandry practices.

The information generated from the apparently healthy animals based on the normal physical examination was used to establish the normal physiological reference values. Approximately 15 ml of blood was withdrawn from coccygeal vein in a sterile disposable 20-ml capacity plastic syringe attached with 20-gauge hypodermic needle. From the collected blood 5 ml of blood was deposited in to a sterile Ethylene Diamine Tetra Acetic acid (EDTA) vials (Hi-media, Bombay) and were agitated for 15-20 seconds to prevent blood clotting.

Haematological evaluation was performed on whole blood. Blood with anticoagulant was used for determining Haemoglobin (Hb) content, Packed Cell Volume (PCV), Total Erythrocyte Count (TEC), Total Leukocyte Count (TLC) and Erythrocyte Sedimentation Rate (ESR).

Haemoglobin estimation was done by Sahil's acid haematin method whereas, TEC and TLC were enumerated under microscope using the Neubauer's chamber (Jain, 1986).

PCV was estimated by centrifugation of anticoagulant added blood in Wintrobe tubes for 40 minutes at 3,000 rpm and measuring the column of cells/ liquid as described by Jain (1986). ESR was estimated as per the method described by Jain (1986). Blood indices viz., Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC) and Mean Corpuscular Volume (MCV) were calculated according to the formula described by Swenson and Reece (1996).

Blood smears prepared from fresh blood after fixing with ethanol, were stained with Haematoxylin-Eosin stain and were used to study the differential leukocytes counts (Jain, 1986).

Results and Discussion

The mean rectal temperature, heart rate / minute and respiration rate/ minute for leopards were recorded as 101.36 ± 0.37 oF, 65.27 ± 2.47 and 13.87 ± 0.76 respectively.

The result of haematological examination is given in table - 1. The statistical analysis revealed no significant affect of sex on the haematological value in leopards.

Mean value of Hb in the present study for leopard noted as 12.98 ± 0.28 g % was consistent with the range (8-13.2 g %) reported by Wallach and Boever (1983) and Hawkey and Hart (1986).

Total leukocyte count for leopard in the present

* Part of the thesis research work

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Table - 1: Haematological Parameters - Leopard

Parameter Mean	Leopard Male (n = 4)			Leopard Female (n = 5)			Leopard Total (n = 9)		
	SD	SE	Mean	SD	SE	Mean	SD	SE	Mean
Hb g %	13.03	0.09	0.44	12.94	0.92	0.41	12.98	0.85	0.28
TLC X 10 ⁻³ /cmm	12925	1372	686	13240	658	294	13100	975	325
TEC X 10 ⁻⁶ /cmm	7.30	0.78	0.39	6.88	0.25	0.11	7.06	0.56	0.19
PCV %	37.75	2.05	1.03	38.64	1.99	0.90	38.24	1.94	0.65
MCV fl	52.32	7.65	3.83	56.19	1.42	0.64	54.47	5.21	1.74
MCH pg/cell	18.05	2.76	1.38	18.84	1.73	0.77	18.49	2.13	0.71
MCHC %	34.49	0.86	0.43	33.57	3.0	1.34	33.98	2.24	0.75
N %	69.25	2.5	1.25	70.4	5.18	2.32	69.89	4.04	1.34
L %	26	2.45	1.22	25.2	1.30	0.58	25.56	1.81	0.60
E %	5.5	2.08	1.04	5.6	1.14	0.51	5.56	1.51	0.50
M %	1.5	0.58	0.07	1.4	1.14	0.51	1.44	0.88	0.29
ESR mm/hr.	42.5	3.11	1.55	42	4.42	1.98	42.22	3.67	1.22

Hb-Haemoglobin; TLC-total leukocyte count; TEC-total erythrocyte count; PCV-packed cell volume; MCV-mean corpuscular volume; MCH-mean corpuscular haemoglobin; MCHC-mean corpuscular haemoglobin concentration; N-neutrophil; L-lymphocyte; E-eosinophil; M-monocyte; ESR-erythrocyte sedimentation rate.

study was recorded as 13100±327/cmm, which substantiates the observations made by Wallach and Boever (1983), Hawkey and Hart (1986) and Anon (1999).

Mean TEC was recorded as 7.06 ± 0.19 x10⁶/cmm, comparable value of TEC has been reported by Wallach and Boever (1983) and Singh *et al.* (1999), however Hawkey and Hart (1986) and Anon (1999) reported non-significantly higher value of TEC for leopards.

The PCV value in the present study for leopard revealed as 38.24 ± 0.65 %, which was in agreement of the value (35-45%) reported by Wallach and Boever (1983), Hawkey and Hart (1986) and by Anon (1999).

Mean values of MCV, MCH and MCHC in the present study for leopard were documented as 54.47 ± 1.74 fl, 18.49 ± 0.71 pg/cell and 33.98 ± 0.75 %. These values of blood indices were found compatible with earlier reports (Hawkey and Hart, 1986; Anon, 1999 and Singh *et al.*, 1999).

The differential leukocyte count was found as N-69.89±1.34%, L-25.56±0.80%, E-5.56±0.50% and M-1.44±0.29% in the present study, however, Hawkey and Hart (1986) reported corresponding value as N-80%, L-16%, E-4% and M-1%.

The observation of ESR value of leopard of the present study(42.22±1.22mm/hr) was comparable to the reported value by Anon (1999).

The present study suggests that haemato-

logical values of the Indian leopard are comparable with the values reported earlier for other subspecies of leopards. Hence the values can be referred as guideline to find out pathological conditions.

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