

Short Communication

**HEMATOLOGICAL AND BLOOD CHEMISTRY VALUES IN SNOW LEOPARD
(*Panthera uncia*) FROM KHUNJERAB NATIONAL PARK, GILGIT BALTISTAN,
PAKISTAN**

T. Hussain^{*1}, M. E. Babar¹, Ziaullah² and W. A. Khan³

¹Department of Molecular Biology, Virtual University of Pakistan, Lahore

²Pet Centre, University of Veterinary and Animal Sciences, Lahore, Pakistan

³ Department of Wildlife and Ecology, University of Veterinary and Animal Sciences, Lahore, Pakistan, Pakistan
Wildlife Foundation, Islamabad

*Corresponding author: tanveer.hussain@vu.edu.pk

ABSTRACT

A blood sample of a female snow leopard (*Panthera uncia*) maintained at Khunjerab National Park, Gilgit-Baltistan, Pakistan was obtained after being tranquilized with a combination of Medetomidine and Ketamine for investigation of basic hematological and blood chemistry values as baseline information. For handling the wild animal, “*Guidelines of the American Society of Mammalogists for the Use of Wild Mammals in Research*” were followed. The vital signs were monitored during the procedure and complete physical examination was performed once the leopard was captured, everything was found in normal healthy condition. Moreover, the animal was not found pregnant. The blood sample was analyzed hematology, blood chemistry and some hormones. The results were compared with available reference values. The hemoglobin concentration in leopard’s serum was 13.4 g/dl, WBC count was $8.1 \times 10^9/L$, total Erythrocyte count was $7.9 \times 10^{12}/L$, and Platelet Count was $273 \times 10^9/L$. The results of Differential Counts showed 48% Neutrophils, 42% Lymphocytes, 9% Monocytes and 1% Eosinophils. The chemical analysis of serum revealed Sodium 150 mmol/L, Potassium 4.7 mmol/L, Chloride 117 mmol/L, Serum Albumins 3.0 g/dl, Calcium 10.3 mg/dl, ALT 131 U/L, AST 211 U/L, Cholesterol 159 mg/dl and Triglycerides 211 mg/dl. The Hormonal assay revealed Thyroid Stimulating Hormone (0.0147 IU/ml and Testosterone 1729 pg/ml).

Key words: Blood chemistry, Hematological investigations, Khunjerab National Park, Snow leopard.

INTRODUCTION

Snow leopard (*Panthera uncia*) is an endangered wildlife species found in the northern mountainous regions of Pakistan (Wegge, 1989; Malik 1997; Roberts, 1997; Qureshi *et al.*, 2011). Its global distribution range extends over Himalayan Region of Central Asia, Pakistan, Tajikistan, Uzbekistan, China, Mongolia, Bhutan and Nepal (Green 1988). Its overall estimated population ranges between 4,500 and 7,500 throughout its distribution range (Fox, 1994), which is continuously decreasing due to its killing by the livestock farmers as a result of Human-Leopard Conflicts. The blood sample of a female snow leopard, being kept in Khunjerab National Park by Gilgit Baltistan Forests and Wildlife Department was obtained. Considering an endangered species on the IUCN Red List of Threatened Species (IUCN, 2014), the basic hematological and blood chemistry findings may be the useful; hence this baseline information was aimed for the study.

MATERIALS AND METHODS

A female snow leopard, approximately 3 year old, weighing 35 kg being maintained at Khunjerab National Park, Gilgit-Baltistan, Pakistan was tranquilized using Medetomidine (Domitor® @ 0.07mg/kg intramuscular) along with Ketamine HCl (Ketaset® @3.5mg/Kg IM). The drugs were given using dart gun (CO2 Injection Gun mod. RD706, TELEDART GMBH & CO. KG). The animal went to deep sleep within 9 minutes post injection of drugs. The blood (8 ml) was collected from left saphenous vein under aseptic conditions. The anaesthesia was reversed using Atipamezole (Antisedan® @3.5mg/kg in divided dose i.e., half IM and half IV). Observations on temperature, pulse rate, dentition, buccal mucosae, chest cavity auscultation and abdominal palpation of the animal were also made. The said blood sample was analyzed for 09 blood parameters including Platelet Count, Hemoglobin, Red Blood Cell Count, White Blood Cell Count, Neutrophils, Lymphocytes, Monocytes, Eosinophils, Erythrocyte Sedimentation Rate. The blood chemistry analysis was also done for various serum components

like, Glucose, Proteins, Blood Urea Nitrogen, Creatinine, Sodium, Potassium, Chloride, Albumin, Calcium, Phosphates, Magnesium, Alanine Aminotransferase, Aspartate Aminotransferase, Cholesterol and Triglycerides. Serum concentration of Thyroid Stimulating Hormone and Testosterone were also determined. The blood sample was transferred to a CBC vial (Lavender top vacutainer) and a blood chemistry vial (Yellow top vacutainer) for preservation and transportation. The specimens were kept in temperature controlled container for further analysis. The specimen in CBC vial was used to find out hematological parameters on Sysmex XE-2100®, and 15 parameters were obtained. The blood chemistry was done on Microlab 300® chemistry analyzer with chemistry reagent kits by Ecoline® - Merck International. The Hormonal Assay (Thyroid Stimulating Hormone and Testosterone) was carried out on Elecsys® Electro Chemi Luminescence (ECL) automated Immunology Analyzer by Roche International. The results obtained were then compared with available reference values. For handling the animal, “Guidelines of the American Society of Mammalogists for the Use of Wild Mammals in Research” (Sikes *et al.*, 2011) were followed.

RESULTS AND DISCUSSION

The body temperature of animal was 102°F during anesthesia with smooth respiration and pulse 110 beats per minute. No complications were observed during and after the procedure. The dental checkup revealed all healthy intact teeth with bright shining canine teeth. The buccal mucosae were pink and healthy without any ulceration. The chest cavity auscultation revealed normal heart and lung sounds without any arrhythmias etc. The abdominal palpation showed no abdominal distension, mass or any fluid inside the abdominal cavity. Moreover, the female animal was not pregnant. The animal was captured injured about eight month ago and is being kept in medical care for healing and is being fed artificially for the last eight months. So there may be the chance of deviated values in blood chemistry and hematological parameters.

The results regarding various hematological parameters are mentioned in the Table 01. The hemoglobin concentration obtained in snow leopard's blood was 13.4 g/dl, which was reported lower (12.98 g/dl) by Sabapara *et al.*, 2008, and (13.0 g/dl) by Salakij *et al.*, 2009 and higher (13.7 g/dl) by Pospíšil, 1987. The results were within the reference range (7.8 – 13.8 g/dl) described by Singh, 2005. WBC count obtained was $8.1 \times 10^9/L$, which was reported higher ($13.1 \times 10^9/L$) by Sabapara *et al.*, 2008, and ($13.0 \times 10^9/L$) by Salakij *et al.*, 2009 and ($9.4 \times 10^9/L$) by Pospíšil, 1987. The results

were within the reference range ($6.2 - 11.05 \times 10^9/L$) described by Singh, 2005. Total erythrocyte count obtained was $7.9 \times 10^{12}/L$, which was reported lower ($7.06 \times 10^{12}/L$) by Sabapara *et al.*, 2008, and ($7.7 \times 10^{12}/L$) by C. Salakij *et al.*, 2009 and Salakij *et al.*, 2010, and ($8.2 \times 10^{12}/L$) by Pospíšil, 1987. The results were within the reference range ($4.66 - 9.15 \times 10^{12}/L$) described by Singh, 2005. The Platelet Count obtained was $273 \times 10^9/L$, which was reported higher ($591 \times 10^9/L$) by Salakij, 2009. The results of differential counts showed 48% Neutrophils (Reference Value 57-75%) with absolute count of $3.68 \times 10^9/L$. Lymphocytes were 42% (Reference Range 18-35% by Singh 2005) with absolute count $3.40 \times 10^9/L$. Monocytes and Eosinophils were 9% and 1% respectively. This hematology picture can be in two conditions, first in blood parasite infection (Babesia or Theileria) and second in case of chronic infection which is the case here. Also the differences in hematology and chemistry could be due to different species under comparison.

The chemical analysis of serum reveals Glucose 10 mg/dl, Total protein 8 g/dl, Urea 46 mg/dl, Creatinine 1.7 mg/dl, Sodium 150 mmol/L, Potassium 4.7 mmol/L, Chloride 117 mmol/L, Serum Albumins 3.0 g/dl, Calcium 10.3 mg/dl, ALT 131 U/L, AST 211 U/L, Cholesterol 159 mg/dl and Triglycerides 211 mg/dl (Table 02). Higher ALT and AST values are transient and may be due to captivity induced stress on liver. Slight increases of AST in blood serum are due to muscle damage in physical injuries before capturing. The results were compared with study of Singh, 2005 who reported that Albumin was found in serum of *Panthera uncia* was 3.5 g/dl, ALT 67 U/L and AST 57 U/L. The same about the albumin in serum of free ranging jaguars was reported by Widmer *et al.*, 2012.

The Hormonal assay revealed Thyroid Stimulating Hormone 0.0147 IU/ml and Testosterone 1729 pg/ml (Table 03).

Acknowledgments: The authors are thankful to Forests and Wildlife Department of Gilgit-Baltistan for their cooperation in collection of blood sample from snow leopard. The authors also acknowledge the cooperation of Khunjerab Villagers Organization (KVO), Gilgit-Baltistan and Mr. Manzoor Ahmad Bami, a local guide for helping the survey team. . Authors are also thankful to University Diagnostic Lab (UDL) and Quality Operations Lab University of Veterinary and Animal Sciences, Lahore, Pakistan and Mr. Abubakar Imranhelping in blood and serum analysis.

REFERENCES

Fox, J.L. (1994). Snow leopard conservation in the wild - a comprehensive perspective on a low density

- and highly fragmented population. In: Fox JL, Jizeng D, eds. Proceedings of the Seventh International Snow Leopard Symposium. Xining, Qinghai, China. 3-15.
- Green, M. J. (1988). Protected areas and snow leopards: their distribution and status. In Proceedings of the Fifth International Snow Leopard Symposium. International Snow Leopard Trust and Wildlife Institute of India, Seattle, Washington. 3-19.
- IUCN (2014). IUCN Red List of Threatened Species. Version 2013.1. (<http://www.iucnredlist.org/details/22732/0>). Accessed on 09th July, 2014.
- Malik, M. (1997). Status and Conservation of Snow Leopard in Pakistan. In Proceedings of the Eighth International Snow Leopard Symposium. (eds R. Jackson & A. Ahmed): 11-20. International Snow Leopard Trust, Seattle, USA.
- Pospíšil, J., F. Kase and J. Vahala (1987). Basic haematological values in carnivores-II. The Felidae. Comparative Biochemistry and Physiology Part A: Physiology. 87(2): 387-391.
- Qureshi, R., W. A. Khan, G. R. Bhatti, B. Khan, S. Iqbal, M. S. Ahmad, M. Abid and A. Yaqub (2011). First Report on the Biodiversity of Khunjerab National Park, Pakistan. Pakistan J. Bot. 43(2): 849-861.
- Roberts, T. J. (1997). Mammals of Pakistan. Revised edition. Ernest Benn Ltd., London.
- Sabapara, R. H., R.G. Jani and C.N. Bhuvu (2008). Hematological Reference Intervals for Indian Leopards (*Panthera pardus*). Vet. World. 1(6): 173-174.
- Salakij, C., J. Salakij, K. Prihirunkit, N.A. Narkkong and D. Pitakkingthong (2010). Characterization of blood cells in the Leopard Cat (*Prionailurus bengalensis*). Vet. Clin. Path. 39(2): 193-198.
- Salakij, C., J. Salakij, N. A. Narkkong, K. Prihirunkit, S. Kamolnorrath, and S. Apibal (2009). Haematology, cytochemical and ultrastructural characteristics of blood cells in leopard (*Panthera pardus*). Comp. Clin. Path. 18(2): 153-161.
- Robert S. Sikes, William L. Gannon, and The Animal Care and Use Committee 1 of the American Society of Mammalogists. (2011). Guidelines of the American Society of Mammalogists for the Use of Wild Mammals in Research. J. Mammal. 92(1):235-253.
- Singh, A. B. (2005). Tigers Blood: Haematological and Biochemical Studies. INTECH. 229-241.
- Wegge, P. (1989). Khunjerab National Park: ecological status and management recommendations. International Workshop on the Management of Planning of Khunjerab National Park: Proceedings (ed. B.G. Bell): 95-114. Government of Pakistan, National Council for Conservation of Wildlife and IUCN, Islamabad, Pakistan.
- Widmer, C.E., M.K.Hagiwara, F. Ferreira and F.C. Azevedo (2012). Hematology and serum chemistry of free-ranging jaguars (*Panthera onca*). J. Wildl. Dis. 48(4): 1113-1118.