

Physiological relationship between thyroid hormones and serum biochemical profile in clinically healthy bactrian camel (*Camelus bactrianus*)

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Received: 06.07.2019

Accepted: 08.12.2019

Abstract

To evaluate both thyroid hormones status in different ages and sexes of Bactrian camel (*Camelus bactrianus*) and the correlations between these hormones and some biochemical parameters, such as electrolytes, lipids, glucose, BUN, and creatinine, these parameters were measured in twenty-six adult camels. The camels in two sexes (male= 18 and female= 8), aged between 2 and 11 years old (2-4 years old= 8, 5-8 years old= 9, and 9-11 years old= 9) were chosen for this study. Significant differences were detected for the thyroid hormones between the two sexes and among the different age groups of camels. Also, there were significant correlations between these hormones and phosphorus, Fe, Na, K, Mg, cholesterol, triglyceride, LDL, HDL, urea, creatinine, and glucose. The cause of these findings and some contradictory findings regarding the relation between serum thyroid hormones, triglyceride and cholesterol are not clear and could be due to the effect of some factors such as breed, geography and diet on serum profiles of sampled groups. More research is needed to evaluate these parameters in *Camelus bactrianus*.

Key words: Thyroid hormones, Biochemical parameters, Bactrian camel (*Camelus bactrianus*)

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References

- Aziz Khan, F.; Patil, S.K.B. and Thakur, A.S. (2014). Lipid profile in thyroid dysfunction: A study on patients of Bastar. *Journal of Clinical and Analytical Medicine*, 5: 12-14.
- Abdelgayoum, A.A.G. (2014). Dyslipidemia and serum mineral profiles in patients with thyroid disorders. *Saudi Medical Journal*, 35 (12):1469-1476.
- Alcalde, A.I.; Sarasa, M.; Raldua, D.; Aramayona, J.; Morales, R. and Biber, J. (1999). Role of thyroid hormone in regulation of renal phosphate transport in young and aged rats. *Endocrinology*, 140(4):1544-1551.
- Adroge, H.J. and Madias, N.E. (2000). Hyponatremia. *The New England Journal of Medicine*, 342(20):1493-1499.
- Aurthor, J.R. and Beckett, G.J. (1999). Thyroid function. *British Medical Bulletin*, 55: 658-668.
- Bansal, A.; Kaushik, A. and Sarathe, H. (2014). Effect of thyroid on lipid profile and renal function: An observational study from Tertiary Care Centre of Tribal Region of Bastar. *The Annals of Medical and Health Science Research*, 4 (Suppl 2): S140-S143.
- Bartley, J.C. (1989). Lipid metabolism and its diseases. In: *Clinical Biochemistry of Domestic Animals*. 4th ed, Kaneko JJ, Academic Press Inc., New York. USA, 106-141.
- Beitz, D.C. (2004). Protein and amino acid metabolism. In: *Duke's Physiology of Domestic Animals*. Reece W.O. (ed.). Cornell University Press, Ithaca, USA. P: 535-553.
- Bruss, M.L. (2008). Lipids and Ketones. In: *Clinical Biochemistry of Domestic Animals*, 6th edn., Kaneko JJ, Harvey JW, Bruss ML (Eds.). Academic Press Inc., New York, USA., ISBN: 13-978-0-12-370791-7, Pp: 81-116.
- El-Sherif, M.M.A. and Assad, F. (2001). Changes in some blood constituents of Barki ewes during pregnancy and lactation under semi-arid conditions. *Small Ruminant Research*, 40: 269-277.
- Eshratkhah, B.; Sadaghian, M. and Eshratkhah, S. (2009). Relationship between the blood thyroid hormones and lipid profile in Moghani sheep: Influence of age and sex. *Comparative Clinical Pathology*, 19(1): 15-20.
- Funk, G.C.; Lindner, G.; Druml, W.; Metnitz, B.; Schwarz, C. and Bauer, P. (2010). Incidence and prognosis of dysnatremias present on ICU admission. *Intensive Care Medicine*, 36 (2):304-311.
- Greenberg, A.; Adroge, H.J.; Aggarwal, N.; Allon, M.; Anderson, S. and Andreoli, S.P. (2010). A primer on kidney diseases. *Elsevier Health Science*, 5th Edition.
- Gross, P.; Benzing, T.; Hensen, J. and Monig, H. (2011). Practical approach to hyponatremia. *The Deutsche Medizinische Wochenschrift*, 136(34-35):1728-1732.
- Gueorguieva, T.M. and Gueorguiev, I.P. (1997). Serum cholesterol concentration around parturition and in early lactation in dairy cows. *Révue de Médecine Vétérinaire*, 148: 241-244.
- Huszenicza, G.Y.; Kulcsar, M. and Rudas, P. (2002). Clinical endocrinology of thyroid gland function in ruminant. *Veterinary Medicine Czech*, 47:199-210.
- Kumar, R. and Rattan, P.J.S. (1992). Plasma thyroidal and adrenocortical hormones during different developmental stages in buffalo heifers. *Indian Journal of Animal Sciences*, 62: 747- 748.
- Khanna, D.; Agarwal, S.P.; Gupta, M.L.; Rai, A.K. and Khanna, N.D. (1996). Effect of water deprivation during summer and winter on thyroid hormones concentration in the Indian camel. *Indian Journal of Animal Sciences*, 66: 253-255.
- Luciani, R.; Falcone, C.; Principe, F.; Punzo, G. and Mene, P. (2009) Acute renal failure due to amiodarone-induced hypothyroidism. *Clinical Nephrology*, 72: 79-80.
- Nazifi, S.; Gheisari, H.R. and Shaker, F. (2002). Serum lipids and lipoproteins and their correlations with thyroid hormones in clinically healthy goats. *Veterinarski Arhiv*, 72(5): 249-257.
- Nazifi, S.; Saeb, M. and Abedi, M. (2003). Serum lipid profiles and their correlation with thyroid hormones in clinically healthy Turkoman horses. *Comparative Clinical Pathology*, 12(1): 49-52.

- Nazifi, S.; Saeb, M.; Rategh, S. and Khojandi, A. (2005). Serum lipids and lipoproteins in clinically healthy Caspian miniature horses. *Veterinarski arhiv*, 75(2): 175-182.
- Nazifi, S.; Nikahval, B.; Mansourian, M.; Razavi, S.M.; Farshneshani, F.; Rahseoar, M. et al. (2009). Relationships between thyroid hormones, serum lipid profile and erythrocyte antioxidant enzymes in clinically healthy camel (*Camelus dromedarius*). *Révue de Médecine Vétérinaire*, 160: 3-9.
- Makino, Y.; Fujii, T.; Kuroda, S.; Inenaga, T.; Kawano, Y. and Takishita, S. (2000). Exacerbation of renal failure due to hypothyroidism in a patient with ischemic nephropathy. *Nephron*, 4: 267-269.
- Müller, M.J. and Seitz, H.J. (1984). Thyroid hormone action on intermediary metabolism. Part III. Protein metabolism in hyper- and hypothyroidism. *Klinische Wochenschrift*, 62: 97-102.
- Poljicak, M.; Terezija, S. and Marenja, K. (2009). Comparative hematological and biochemical values in pregnant and non-pregnant red, Cervuselaphus, and fallow deer, Damadama, females. *Folia Zoology*, 58:36-44.
- Rodriguez, M.N.; Tebot, I. and Le Bas, A. (1996). Renal functions and urea handling in pregnant and lactating Corriedale ewes. *Canadian Journal of Animal Science*, 76: 469-472.
- Tajik, J.; Nazifi, S. and Badieli, K. (2011). Correlations of serum leptin with lipids, lipoproteins, and thyroid hormones in Water Buffalo (*Bubalus bubalis*). *Comparative Clinical Pathology*, 21(5): 1013-1017.
- Tajik, J.; Sazmand, A.; Hekmati Moghaddam, S.H. and Rasooli, A. (2013). Serum concentrations of thyroid hormones, cholesterol and triglyceride, and their correlations together in clinically healthy camels (*Camelus dromedarius*): Effects of season, sex and age. *Veterinary Research Forum*, 4 (4): 239-243.
- Yousif, H.S.; Omer, S.A. and Ahmed, S.H. (2017). The effect of seasonal variations, pregnancy and management system on the blood minerals and thyroid hormones of camels. *International Journal of Scientific Engineering and Science*, 1(11): 99-103.
- Wang, C. (2013). The relationship between type 2 diabetes mellitus and related thyroid diseases. *Journal of Diabetes Research*, 2013: 390534.
- Wasfi, I.A.; Hafez, A.M.; Tayeb, F.M.A.; Taher, A.Y.; Eltayeb, F.M.A. and El-Taher, A.Y. (1987). Thyroid hormones, cholesterol and triglyceride levels in the camel. *Research in Veterinary Science*, 42: 418.