SHORT COMMUNICATION

Epidemiology and Hemato-Biochemical Changes in Mange Infested Goats

Kuntal S. Shah[1]*, Ghanshyam C. Mandali[1], Neha Rao[2], Ashish C. Patel[3], Ronak P. Panchal[1]

Abstract

Mange in goats is a contagious skin disease characterized by crusty, pruritic dermatitis and patchy/generalized alopecia. It is caused by a variety of parasitic mites burrowing in or living on the skin. For the present study, 30 mange-infested goats of Surti and Marwari breeds were selected from those presented at the Veterinary Clinical Complex of the College and from surrounding villages of Anand, and six goats from the University farm were taken as a healthy control group. The maximum prevalence of sarcoptic mange was found in the age group of 1-2 years of age (60.00%), followed by >2 years (26.67%) and <1 year (13.33%) age groups, and also in females than the males (76.67% vs. 23.33%). Hematological examinations revealed that the mean (±SE) values haemoglobin, total erythrocyte count, total platelet count, pack cell volume, neutrophils, and monocytes were decreased significantly ($p < 0.01$), whereas total leucocyte count, lymphocytes and eosinophils were increased significantly ($p < 0.01$) in mange affected goats in comparison to healthy goats. The serum biochemical examinations revealed that the mean (±SE) values of alanine aminotransferase activity, total protein, zinc, and copper were significantly decreased ($p < 0.01$). In contrast, aspartate aminotransferase activity was non significantly increased ($p < 0.01$) in mangy goats, and no significant difference ($p > 0.01$) was found in values of creatinine when compared with healthy goats.

Keywords: Hemato-biochemical alterations, Goat, Mange infestation, Prevalence.

Ind J Vet Sci and Biotech (2022): 10.21887/ijvsbt.18.2.27

Introduction

One of the most important components of the livestock industry is goat farming. It is suitable for landless and marginal farmers, as goats have the adaptability to harsh climates. They are multi-purpose animals, commonly reared for milk and meat (chevon), wool/hair/ leather, and a variety of cashmere/ mohair fibers in the different parts of the world (Smith and Sherman, 2009). Its contribution in supplying milk and its products is high, and it has a significant role in the upliftment of the rural economy and health (Bhattarai, 2014). The goats are universally also known as "Poor Men's Cow" (Iqbal *et al*., 2008). Disease is a major impediment against successful goat keeping. Various infectious and non-infectious diseases affect goats, including parasitic and metabolic disorders. Mange mites, when in prolonged contact with the skin of the host, cause the condition known as mange. Mites are obligate parasites and spend their life cycles, from egg to adult, on the host, so that transmission is mainly by contact. Goats can be overrun by many species of burrowing and non-burrowing mites(Fentanew *et al*., 2015); however, the species more normally found are scabies mite (*Sarcoptes scabiei*), goat follicle mite (*Demodex caprae*), psoroptic ear mite (*Psoroptes cuniculi*), and chorioptic scab mite (*Chorioptes bovis*) (Talley, 2007). The scabies mites burrow into the skin of its host, inflicting varying degrees of dermatitis, leading to a condition known as sarcoptic mange. This investigation was planned to compare the Hemato-biochemical changes among mange infected and healthy goats under middle Gujarat climate.

[1]Department of Veterinary Medicine, College of Veterinary Science & Animal Husbandry, Anand Agricultural University, Anand-388001, India.

[2]Veteronary Clinical Complex, College of Veterinary Science & Animal Husbandry, Anand Agricultural University, Anand-388001, India.

[3]Department of Animal Genetics and Breeding, College of Veterinary Science & Animal Husbandry, Anand Agricultural University, Anand-388001, India.

Corresponding Author: Kuntal S. Shah, Department of Veterinary Medicine, College of Veterinary Science & Animal Husbandry, Anand Agricultural University, Anand-388001, India, e-mail: kuntalshah2007@gmail.com

How to cite this article: Shah, K.S., Mandali, G.C., Rao, N., Patel, A.C., & Panchal, R.P., (2022). Epidemiology and Hemato-Biochemical Changes in Mange Infested Goats. Ind J Vet Sci and Biotech. 18(2), 123-125.

Source of support: Nil

Conflict of interest: None.

Submitted: 12/09/2021 **Accepted:** 14/02/2022 **Published:** 10/04/2022

Materials and Methods

This investigation was carried out from November 2020 to April 2021. Initial sampling was done from the 54 goats of Surti and Marwari breeds suffering from skin afflictions and presented at the Veterinary Clinical Complex (VCC), Veterinary College, Anand, and nearby villages of Anand district. Skin scrapping of all these animals was examined, revealing mange infestation of varying degrees in 30 goats.

The information on epidemiological parameters such as age and sex were also collected in the present study. All animals were grouped as per their age into <1 year, 1–2 years, and >2 years class. Blood samples (4 ml) were collected from the jugular vein in sterile plastic K_3EDTA vials from all 30 affected animals, and six healthy goats from the University farm as a control for Hematological analysis by automatic whole blood analyzer (Abacus Junior Vet-5) and about 6 mL blood was collected in clot activator vials for serum separation. The serum samples were stored at -20°C until analyzed. The serum biochemical parameters studied included alanine aminotransferase (ALT/GPT), aspartate aminotransferase (AST/GOT), total protein, and creatinine by using standard assay kits with the help of clinical serum biochemistry auto-analyzer (CKK 300). Serum zinc and copper concentrations were estimated using a spectrophotometer. The data was analyzed statistically by using an unpaired t test (Snedecor & Cochran, 1994).

Results and Discussion

The overall prevalence rate of mange was 55.56% (30/56). The detailed results of age-wise mange infestation are presented in Table 1. The maximum prevalence of sarcoptic mange was found in the age group of 1–2 years (60.00 %), followed by >2 years (26.67%) and <1 year (13.33%). Beyecha *et al*. (2014) and Nuru and Mhatebu (2017) also reported the highest prevalence of mange in the young age group of goats.

The mange infestation was more in female (76.67%, 23/30) than male (23.33%, 7/30) goats, which indicates that more females were affected than the males. Yacob *et al.* (2008) and Nuru and Mhatebu (2017) also reported a higher prevalence of mange in females as compared to males.

Hematological Findings

The results of Hematological findings (Table 2) reveal that the levels of haemoglobin (Hb), total erythrocyte count (TEC), total platelet count(TPC), packed cell volume(PCV), neutrophils, and monocytes were decreased highly significantly ($p < 0.01$), whereas those of total leucocyte count(TLC), lymphocytes and eosinophils were increased significantly ($p < 0.01$) in mange affected goats as compared to the healthy control group. These findings were in accordance with the earlier reports of Sinha *et al*. (2004), Pawar *et al*. (2012), Kumar *et al.* (2016) and Beigh *et al.* (2013) in mange infested and healthy animals of different animal species. The decreased value of Hb, PCV, and TEC in mange affected goats may indicate anemia compared to healthy goats. These mites scrape the skin surface, feed on exudates, and ooze blood from small surface haemorrhages, leading to decreased haemoglobin concentration and red blood cells. A decrease in Hb concentration might also be due to decrease in TEC. An increase in TLC may be due to secondary bacterial infection or due to stress caused by damage to skin.

Table 1: Age-wise prevalence of sarcoptic mange infestation in goats (n = 30)

Age	*No. of goats*	*Percent*
< 1 years	04	13.33
1 – 2 years	18	60.00
> 2 years	08	26.67
Total	30	100.00

Biochemical Findings

The results presented in Table 3 show that the serum alanine aminotransferase(ALT), total protein, zinc, and copper levels were decreased highly significantly ($p < 0.01$), aspartate aminotransferase (AST) was increased non significantly in mange affected goats than in the healthy control group, and no significant difference was found in the values of serum creatinine between them. These findings were in accordance with the earlier reports of Sinha *et al*. (2004), Pawar *et al*. (2012), Beigh *et al.* (2013), and Kumar *et al.* (2016). The reduction in serum total protein is attributed to the seepage of protein through exudation extravasation of fluids to interstitial tissues and tunnels made by mites. The values of AST and ALT vary according to the liver function associated with the animal's physiological and health conditions. Kumar *et al*. (2016) reported a significant increase in values of AST and ALT in mangy goats compared to healthy ones. However,

Table 2: Hematological findings of healthy (n = 6) and manage infested goats (Mean ±SE)

Hematological Parameters	*Healthy goats (n = 6)*	*Mange infested goats (n = 30)*
Hb (g/dL)	11.77 ± 0.44	8.42 ± 0.10**
TEC ($\times 10^6$/µL)	12.87 ± 0.75	7.15 ± 0.19**
TLC ($\times 10^3$/µL)	10.19 ± 1.07	17.28 ± 0.68**
TPC ($\times 10^3$/µL)	393.67 ± 32.56	196.07 ± 9.19**
PCV (%)	29.21 ± 1.47	18.04 ± 0.33**
Lymphocytes (%)	30.75 ± 2.31	45.87 ± 0.56**
Neutrophils (%)	68.00 ± 2.23	52.22 ± 0.72**
Eosinophils (%)	6.73 ± 0.51	15.47 ± 0.41**
Basophils (%)	0.58 ± 0.12	0.46 ± 0.04^{NS}
Monocytes (%)	1.22 ± 0.19	0.34 ± 0.03**

**Significant at $p < 0.01$ between groups; NS-Non-significant.

Table 3: Serum biochemical findings in healthy and manage infested goats (Mean ± SE)

Biochemical Parameters	*Healthy goat (n = 6)*	*Mange infested goats (n = 30)*
Serum ALT (U/L)	16.33 ± 1.53	6.48 ± 0.34**
Serum AST (U/L)	346.99 ± 21.34	397.87 ± 7.98^{NS}
Serumtotal protein (g/dL)	8.09 ± 0.27	3.27 ± 0.24**
Serumcreatinine (g/dL)	1.06 ± 0.02	1.07 ± 0.04^{NS}
Serum zinc (µg/dL)	100.34 ± 5.50	64.49 ± 1.24**
Serumcopper (µg/dL)	129.29 ± 4.75	100.41 ± 1.65**

**Significant at $p < 0.01$ between groups; NS-Non-significant.

Gorakh *et al.* (2000) and Pandya *et al.* (2020) reported a decrease in ALT in camels suffering from sarcoptic mange infestation, as we found. Still, the clarification for this decline was difficult. The indifferent serum creatinine levels observed among the two groups suggest that mange infestation does not alter kidney function as it is a localized skin disorder.

Conclusion

The study concluded that the prevalence of mange was higher in female goats, compared to males and in 1-2 years of age group compared to very young or old age group goats. Also, mange infestation in goats caused a significant decrease in Hb, TEC, TPC, PCV, neutrophils, monocytes, serum ALT, total serum protein, zinc, and copper, and an increase in TLC, lymphocytes, eosinophils, serum AST without affecting serum creatinine values.

Acknowledgement

We thank the Professor & Head, Veterinary Clinical Complex and Dean, Veterinary College, AAU, Anand, for the facilities and cooperation provided for this work.

References

Beigh, S.A., Soodan, J.S., Singh, R., & Raina, R. (2013). Plasma zinc, iron, vitamin A and Hematological parameters in dogs with sarcoptic mange, *Israel Journal of Veterinary Medicine*, *68*(4), 239-245.

Beyecha, K., Kumsa, B., & Beyene, D. (2014). Ectoparasites of goats in three agro-ecologies in central Oromia, Ethiopia, *Comparative Clinical Pathology*, *23*, 21-28.

Bhattarai, R.R. (2014). Importance of goat milk, *Journal of Food Science & Technology*, ***7,*** 107-111.

Fentanew, A., Derso, S., Melaku, S., Belete, S., Girma, H., & Mekonnen, N. (2015). A review on epidemiology of mange mites in small ruminants, *Acta Parasitologica Globalis*, *6*(3), 182-192.

Gorakh, M., Sena, D.S., Rajender, K., & Sahani, M.S. (2000). A study on clinical, Hemato-biochemical, and histopathological aspects of mange in camels. *Journal of Veterinary Parasitology*, *14*(1), 27-30.

Iqbal, A., Khan, B.B., Tariq, M., & Mirza, M.A. (2008). Goat - A potential dairy animal: Present and future prospects, *Pakistan Journal of Agriculture Sciences,45*(2), 227-230.

Kumar, M., Pal, B., Purkayastha, R.D., & Roy, J. (2016). Clinico-pathological and therapeutic evaluation of Black Bengal goats (*Capra hircus*) infested with *Psoroptes cuniculi* mange, *Journal of Parasitic Diseases*, *40*(1), 41-45.

Nuru, H.B., & Mhatebu, W.T. (2017). Prevalence of mange mites on small ruminants in Haramaya Wereda (district), East Hararge Zone, Ethiopia, *International Journal of Research - Granthaalayah*, *5*(4), 191-201.

Pandya, N.R., Mandali, G.C., Dave, K.M.,& Raval, S.K. (2020). Epidemiology and Hemato-biochemical changes in mange infested camels, *Indian Journal of Veterinary Science and Animal Biotechnology*, *16*(1), 58-61.

Pawar, K.G., Vishe, H.P., Gupta, H.K., & Rao, G.S. (2012). Prevalence and Hemato-biochemical studies in parasitic and non-parasitic dermatological disorders in Surti buffalo and buffalo calves, *Veterinary World*, *5*(4), 230-235.

Sinha, S., Kumar, A., & Prasad, K.D. (2004). Hemato-biochemical variations during mange mite infestation in pigs and its therapeutic management. *Journal of Parasitic Diseases*, *28*(2), 127-129.

Smith, M.C., & Sherman, D.M. (2009). Fundamentals of Goat Practice, In: *Goat Medicine* (2nd ed).Wiley-Blackwell, p. 3-22.

Snedecor, C.W., & Cochran, W.G. (1994). *Statistical Methods* (6th edition). Iowa State University, Press Ames, Iowa, USA.

Talley, J. (2007). External parasites of goats, *Proceedings of 22nd Annual Goat Field Day*, Langston University, Langston, p. 76-80.

Yacob, H.T., Yalew, T.A., & Dinka, A.A. (2008). Ectoparasite prevalence in sheep and in goats in and around Wolaita Soddo, Southern Ethiopia, *Revue de Médecine Vétérinaire*, *159,* 450-454.